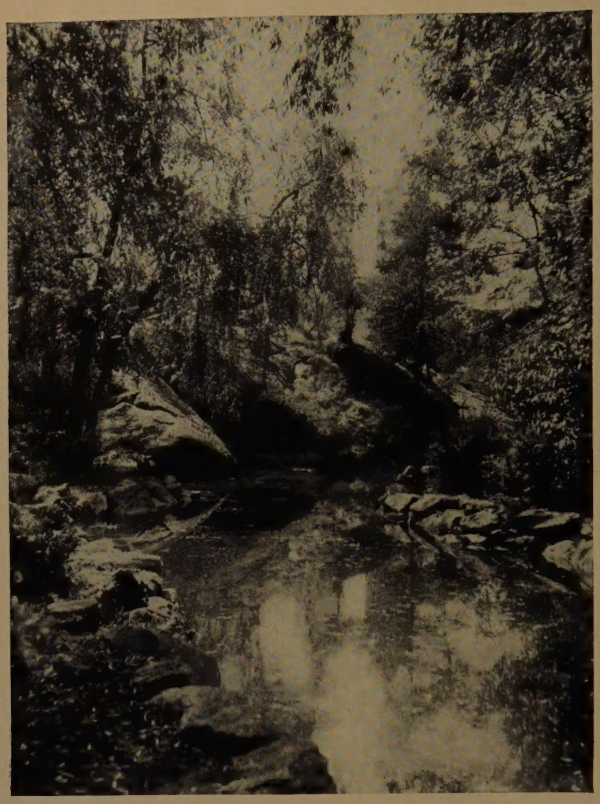
NATURE MAGAZINE

JUNE 1934 35¢ VOL. 23. NO. 6



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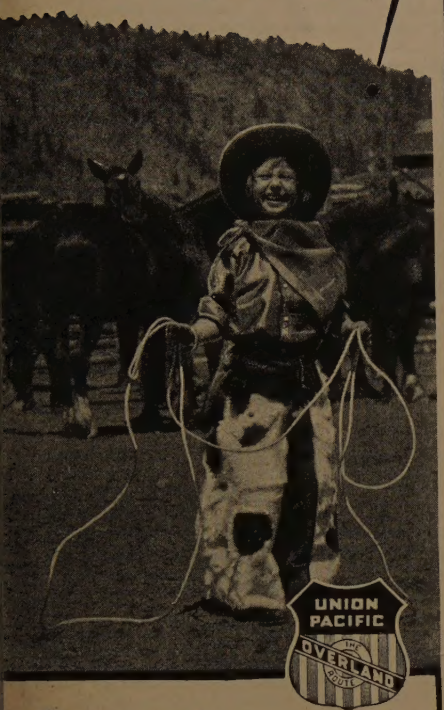

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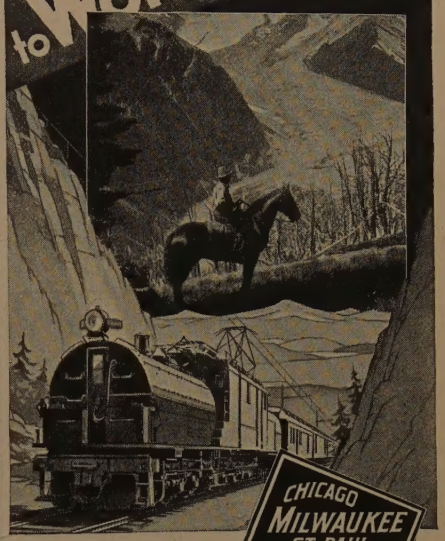

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The camps represented on this page represent a considerable investment. Some have cost close to $100,000. Most represent a cost of at least $30,000 to build and equip.

The average camp season is eight weeks, but the overhead and repairs cost as much as though the buildings were used fifty-two weeks in the year. The average camp pays its councillors well. The average camp fee is between $250 and $300. Some camps charge more, but this often includes riding and other extras. There are excellent camps that charge $200 or less for the summer.

Write us about the particular needs of your boy or girl and let us know what you wish to pay and we shall be glad to offer specific suggestions. Richard Deshon, Director Camp Service, NATURE MAGAZINE, Washington, D. C.

Chance for Boys

Based on long and careful planning, an interesting program for a trip to Sweden for boys has been worked out by Birger Nordholm, representative of the Swedish Government in this country. Under the leadership of Robert Carver French, headmaster of the Garey School in Aberdeen, Maryland, a group of American schoolboys will visit Sweden, touring Sweden and Denmark, meeting Scandinavian boys and visiting Scandinavian families and spending two weeks at the Siljansgärden Summer Camp in Dalecarlia, Sweden. The party will start July 3 and return to New York on August 27. The itinerary is fascinating, promising a summer that will be both recreational and educational. The cost is amazingly moderate. Such activities as this should be fostered by all countries to the end that the youth of today may be tomorrow's guarantors of international friendship.

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By Benton Minnich

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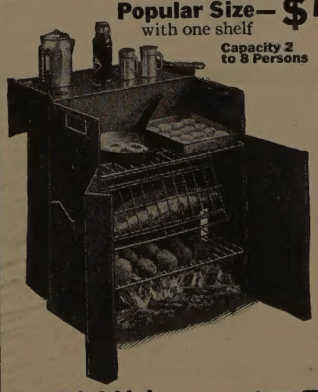

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A MAN AND AN OPPORTUNITY

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JAY N. DARLING HAS TASK AS BIOLOGICAL SURVEY CHIEF

To us one of the most interesting appointments of the Roosevelt Administration is that of Jay N. Darling to be Chief of the United States Bureau of Biological Survey. Uncomplicated by party politics, scientific shibboleths or entangling allegiances to sportsmen's groups, this selection comes at a time when our wild life resources were never more sorely in need of a militant friend in a position of power.

Mr. Darling is confronted with a splendid opportunity. He is, also, faced with a difficult task. Although this is a dark hour for nearly every species of game bird in North America, the new chief will be importuned by many whose selfish desires to kill and to profit by the processes of killing outweigh any solicitude for the future. He will have need of strength to resist the demands of those who will fight any move to check the principal cause of the continued decline of our game birds—the man with the gun. He will hear the usual pleas that natural enemies, drought and disease are to blame. He will listen to other specious arguments which ignore the fact that depleted stocks of game can be built up only if the efforts of the conservationists are matched by a lively sense of the need for restraint—self imposed or otherwise—on the part of those who kill.

Beside the great problem of restoring and conserving our game birds, the new chief finds several vexing problems unsettled. One of these is poison. While there may be need for a reasonable amount of control of harmful animals, punishment should be limited to the guilty, and by selective methods. Before that can be done a knowledge of guilt should be definitely established. Far too little is known of the actual relationships of predator and prey. This information should be acquired and, in the interim, the over-enthusiastic and illy-conceived campaign of poisoning should be severely curtailed.

Another vexing question relates to methods of taking waterfowl. At a recent Congressional hearing Mr. Darling left no doubt in the mind of anyone as to his enmity to baiting as an illegitimate offspring of "sportsmanship." In fact, both baiting and live decoys are among the most flagrant of these methods. They lack justification both in ethics and expediency. We are pleased to note that certain of the sportsmen's associations are backing up those who do not kill in their opposition to these practices. This is significant and encouraging to an important degree.

There are also carried on many considerable campaigns for the wholesale slaughter of certain non-game birds. Often they are sponsored by firearms companies intent on selling cartridges through the closed season. The harm that results to innocent wild life is enormous. Extensive study by the Biological Survey and others has shown that most of our flesh-eating and fish-eating birds are by no means as guilty as charged. These findings should be more widely disseminated and more generally known and respected. The craze for killing contests directed against alleged wild destroyers of game, and especially rampant this season, is unjustified by the facts and unworthy of encouragement by any conservation organization.

These are a few of the problems confronting Mr. Darling. We hope and believe that he will meet them with facts and handle them with the militant courage we know to be his. No one who has seen the telling wild life cartoons signed "Ding" can doubt the utter contempt of Mr. Darling for the game hog and the killer. Both by word and drawing pencil he has expressed his complete scorn of those who masquerade as protectors, yet who by act and speech seek only to obtain greater killing privileges.

Mr. Darling's record as a member of the State Fish and Game Commission of Iowa is a notable one and augurs well for the future conduct of the Biological Survey. His experience as a member of the Advisory Board of the Migratory Bird Treaty Act, will be of value in interpreting the recommendations of that body. Mr. Darling's most recent conservation post, prior to his appointment, was as a member of the President's Committee on Wild Life Restoration. We do not know how much the report of this Committee reflected his views and how much they were the opinions of the other members, but we trust that our wild life, whose plight he so forcibly portrays in the spirited cartoon that forms the frontispiece of the report, will now receive his solicitous care as regards several unfavorable factors not mentioned in the findings of that committee.

We wish for Mr. Darling the success which the opportunity before him now makes possible. We offer our cooperation. If we find ourselves in disaccord we shall say so. Equally we shall vociferously applaud every move he makes in the direction of sincere and unselfish conservation of our wild life resources. R. W. W.

A SILHOUETTE STUDY
BY
FLORENCE K. TOMLINSON

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OFFICIAL PHOTOGRAPH, U. S. NAVY

A WATERSPOUT OFF BAYOU GRANDE, FLORIDA

In the distance at the left another waterspout may be seen forming beneath the dark and angry skies

DRAGONS OF THE DEEP

BY CHARLES FITZHUGH TALMAN

GOING to sea was a real adventure in the days when, according to common belief, you were in danger at any moment of finding your cockle-shell ship at the mercy of a ferocious dragon, whose body towered as high as the clouds. Such was the conception of a waterspout that prevailed through the middle ages, and one result of its prevalence was that the name "dragon" was conventionally applied to waterspouts long after these whirling columns ceased to be regarded as living monsters.

From this superstitious belief also arose the custom of firing guns and cannons at waterspouts as a means of protection against them. These monsters were supposed to be skittish creatures, who would easily take fright at loud noises. Before the invention of gunpowder mariners who sighted a waterspout were wont to shout, stamp on the deck, beat drums or clash swords in order to scare the creature away. When firearms were introduced on shipboard they were naturally pressed into service for the same purpose.

Nowadays waterspouts are still fired at, though more

often in storybooks than in real life. The sailor who has recourse to this process does not, of course, believe that he is shooting at a living animal, but he cherishes the notion that the vibration due to the discharge suffices to break up the column, and even the blowing of a ship's whistle has been alleged to have the same effect.

Doubtless these noise-making expedients have often seemed to "work," for the simple reason that waterspouts are short-lived—lasting, on an average, only about fifteen minutes—so that one is likely to collapse from natural causes soon after the noise is produced, but there is no scientific justification for them. A waterspout is a powerful whirlwind, and the sailor can no more break it up with sound waves than he can raise a breeze by scratching the mast.

PHOTOGRAPH BY F. A. PERRET

A WATERSPOUT CAUSED BY A VOLCANO

Where the water had been heated by a lava flow during the eruption of Mount Sakurajima in Japan in 1914. Below is a waterspout formed from the waters of a lake, in this case Jackfish Lake in Saskatchewan

A waterspout is sometimes described as a sea tornado, and it is similar in many respects to the tornadoes of the land. In fact, a tornado occasionally goes to sea and becomes a waterspout, while a waterspout may invade the land and become a tornado. There are, however, certain differences between waterspouts as a class and tornadoes as a class that justify their distinctive names.

Both of these things are local whirls in the atmosphere, which, by flinging the air outward—i.e., by centrifugal action—cause expansion in their cores; a process that involves cooling. Invisible water vapor is thus condensed to form a column of cloud. In the case of the tornado the cloud that dangles to the ground is seldom mistaken for anything else, but there are probably many people who think—as nearly everybody once did—that the corresponding cloud of the waterspout is an actual stream of water connecting the sea and the sky.

Tornadoes are very rare outside of the temperate zone, where they are mostly confined to the southeast quarter of a large traveling cyclonic disturbance, or "low"; waterspouts, on the other hand, are commoner within the tropics than elsewhere, and are not necessarily associated with cyclones. The average tornado is, moreover, much larger and more violent than the average waterspout.

Another point of difference is that while the havoc wrought by a tornado is due entirely to wind, a waterspout often discharges great volumes of water on vessels or other objects it encounters, and this deluge is capable of doing much damage. Though the column of the spout consists mainly of cloud—sometimes so thin that distant objects can be plainly seen through it—the water at its base is whipped into a violent turmoil by the whirling air, and a great amount of spray is carried aloft. In some big spouts water has been seen to be swept up to a height of several hundred feet and then tossed off in a great cascade surrounding the column.

Besides gathering water from below, a waterspout condenses water rapidly from the air at the top of the column, and apparently in many cases this water is held up temporarily by the vortex and later discharged in a veritable "cloudburst" when the force of the whirl slackens. The downpour is doubtless sometimes heavy enough to swamp a small vessel. A few years ago the White Star liner *Pittsburgh* was struck bow-on by a waterspout in mid-Atlantic. The crow's-nest, 70 feet above the sea, was filled with water,

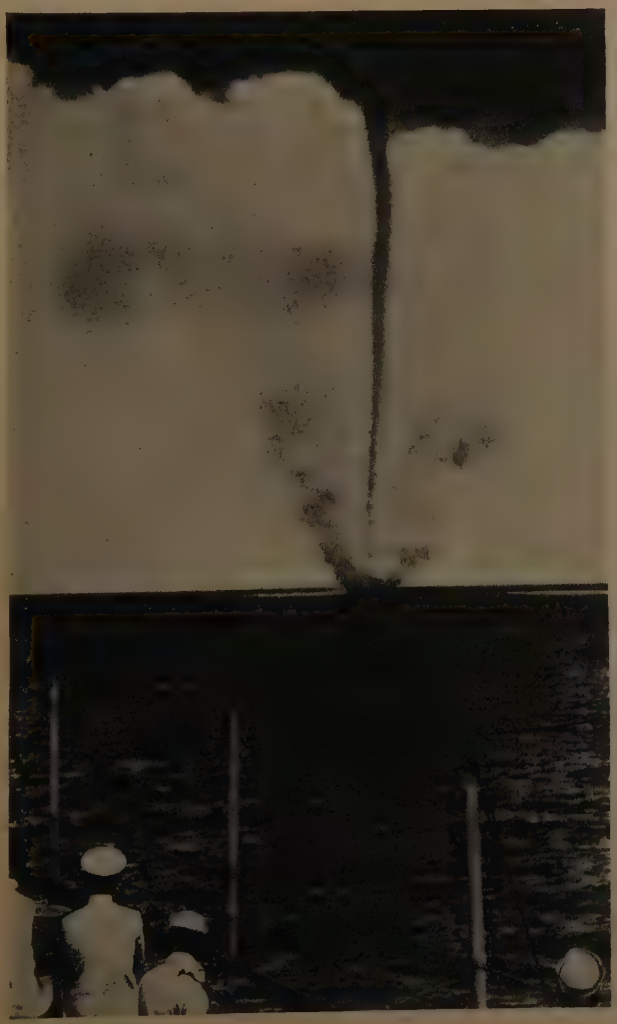
WATERSPOUT ON THE SOUTH ATLANTIC

The picture was taken from the S. S. Sierra Morena in January, 1927. Note the tenuous base of the column

PHOTOGRAPH FROM NORTH GERMAN LLOYD

AWE-INSPIRING

This striking U. S. Navy photograph is of a spout seen at the mouth of the Yangtsekiang, China, from the deck of the U. S. S. Pittsburgh. It was observed on July 21, 1928



tons of which dropped on the decks. The bridge was wrecked, the chart room was badly damaged and the officers' cabins were flooded.

At Swansea, Wales, in September, 1886, a waterspout was seen to travel from the adjacent bay to an eminence called Kelvey Hill. The latter is about 650 feet high and the upper part is almost vertical, while on the lower slope some rows of houses had been built. When the spout struck the hill great torrents of water rushed down the slope, burst through the upper row of houses and carried all their movable contents into the street below. Many people were washed from a back room into a front room, out of the door and down the hill. The amount of earth and rock washed down by the torrent was estimated at 8000 tons.

Some waterspouts, however, are comparatively dry. One that struck the face of a cliff at Tatoosh Island, Washington, in 1917, produced no downpour, but, according to witnesses, "utterly vanished like a burst bubble." Lieutenant Kincaid, of the Navy, while navigating officer of the *U.S.S. Kittery* in the West Indies, had the experience of passing through the middle of a waterspout and observed only a fine mist in the air.

Waterspouts tend to be gregarious. As many as thirty have been sighted from a ship in a single day, and a large collection of records examined by W. E. Hurd, of the Weather Bureau, showed that in fully half of all the cases reported more than one spout was seen at a time. The heights of spouts range from a few feet up to a mile or so. The diameters are equally various. One seen off the coast of New South Wales many years ago was 5000

feet high and only ten feet broad except at the top and base, while, at the opposite extreme, a spout seen off the California coast in 1914 is said to have been 700 feet in diameter though only 100 feet high.

The speeds at which waterspouts rotate probably do not vie with the 400 or 500 miles an hour ascribed to some tornadoes, but they are high enough to constitute a real danger to vessels. Several sailing vessels have been partially or completely dismasted by waterspouts and some have been capsized. The danger to aircraft is, of course, still greater. Fortunately waterspouts rarely occur during the hours of darkness, so that the aviator can usually give them a wide berth, but there was a recent case in which a big passenger plane, flying, with poor "visibility," over the English Channel, came within an ace of running through a spout. Though the pilot sighted it just in time to turn aside, the winds at its border tossed the machine in all directions and gave its occupants a terrifying experience.

Waterspouts most frequently advance in the direction of the surface wind, but often

IN SWITZERLAND

This photograph of a waterspout on Lake Zug in 1905 is reproduced by courtesy of Schweizerische Meteorologische Zentral-Anstalt

FROM FONVIELLE, "ÉCLAIRS ET TONNERRE"

A WASTE OF GUNPOWDER

The firing of cannons at waterspouts is futile and a mere survival of old superstitions

in other directions. Some move slowly or even seem to remain stationary for a time, while others progress at terrific speed. Three seen at one time from a ship on the North Pacific were estimated to be traveling over the water at eighty miles an hour. Few spouts last as long as an hour. Some form and disappear within a couple of minutes.

The columns may be vertical or inclined, straight or crooked. A spout seen from the British *S.S. Wabana* in September, 1916, was about 3500 feet high; it extended from the clouds vertically for 500 feet, then horizontally for 2000 feet, and again vertically to the sea. Cases have been reported in which, through an effect of perspective, the column appeared to tie itself in a knot, an appearance also sometimes reported of tornadoes.

Some spouts have exhibited curious pulsatory movements. One seen from the British *S.S. Aranga* in September, 1914, had been watched for half an hour when it appeared to bulge out several times along the column, each swelling sending out large masses of water. "Finally," reported the observer, "it took a round turn and broke, the upper end curling upwards like a released steel spring." A strange variety of waterspout, more than once reported, appears to have a double wall. Still another oddity reported a few years ago consisted of two distinct columns extending down from the clouds and merging into a single spout at the base.

In May, 1920, numerous waterspouts were sighted from the British *S.S. Carston* off the coast of Cuba. After they

had been under observation for some time a strange sight was witnessed. "Around some of these spouts," writes an officer of the ship, "two or three—and in one case four—slender, weedy-looking spouts were formed. They not only traveled with the big spouts, but also at the same time circled slowly around them, after the manner of satellites revolving around a planet. Sometimes they approached the central spout, sometimes receded from it, at the same time undulating violently." Similar evolutions have been reported of the "dust devils" that haunt the plains of India.

Waterspouts are not peculiar to the ocean. Many fine examples have been seen over lakes and rivers, both in our own country and abroad.

In his famous poem, the "Lusiad," first published in 1572, the Portuguese poet Camoens describes a waterspout from personal observation, and notes that the water discharged by the spout was fresh and not salty. Other observers have testified to the same effect. Benjamin Franklin reported the case of a sailor who was at the helm when a spout broke over him, and who stated that the water running into his mouth and nose "tasted perfectly fresh."

Thus the idea has crystallized that waterspouts formed over the ocean consist entirely of fresh water, but for reasons already set forth in the present article this idea cannot be correct. The base of a spout always contains a large amount of spray churned up from the sea, and this is, of course, salty. The water condensed in the column itself or discharged from the clouds above is fresh. Hence, whether the water that occasionally deluges a ship caught in a waterspout is salty, brackish or fresh depends entirely upon circumstances, and there is no definite rule.

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CURIOUS LOUSE TICKLES HONEY BEE

BY HAROLD HARRIS

LIKE every other living creature, the honey bee has her troubles. Among the little things that irritate her is a tiny louse, known scientifically as *Braula coeca.*

Many interesting facts about the structure and habits of this curious little insect have become known through a study made recently by two University of Minnesota entomologists, Erwin C. Alfonsus and Erman Braun, who secured one hundred specimens from the University of Vienna, Austria.

THE PECULIAR BEE LOUSE

It is only about the size of the head of a common pin. Below, an enlarged drawing of the foot of the louse which tickles the bee

The bee louse does not bite the bee, nor suck its body juices. It is not, therefore, a true parasite, but rather a commensal, an unwelcome guest of the bee colony, which steals its food from the foraging or nurse bees. Ordinarily, the louse stays on the thorax of the honey bee, but when it wishes to eat it crawls forward and tickles the bee's mouth. This causes the bee to stick out its tongue from which the louse sucks the honey, pollen or nutritive fluid.

Not only does the louse share the bee's food, but it likewise shares the bee's home, laying its eggs in the brood combs so that the young bees and the young lice hatch out together.

A remarkable feature of the bee louse is its double-purpose tarsi, or feet, which enable it to cling tightly to the bee and also to walk on smooth surfaces. The basal portion of each foot is a claw, shaped like a comb and having thirty-two teeth. Thus by clasping the fine, branching hair which covers the body of the bee, the louse can hang on tenaciously. Above the claws of the louse, at what might be called the knee joint, there are two small lobes, called pulvilli, densely covered with glandular hairs which secrete a sticky substance. When the insect walks on anything smooth, it simply turns under the comb-like claws, allowing the sticky hairs of the pulvilli to come in contact with the surface, just as an ordinary housefly does when he walks upside down on the ceiling.

The Minnesota study revealed that the scientific name of the bee louse, *Braula coeca,* meaning "blind louse," is wholly inaccurate, since the insect is neither blind nor a true louse. It has two small, inconspicuous eyes, and instead of being a louse is really a fly, which through evolution has lost its wings. It is a six-legged, reddish-brown creature, scarcely as large as a pin head. Its body is coated with a thick, hard shell, bearing numerous bristles.

The actual damage caused by bee lice would be slight but for the fact that they particularly molest the queen bee, because she is constantly being fed. During the winter the lice often infest the queen so heavily that she is killed, resulting in the dying-out of the colony.

Bee lice are common in Europe, but only recently appeared in the United States. They are now found in some eastern states and have been observed as far west as Mankato, Minnesota. No control measures for them are known.

OUR TENANTS IN THE "THIRD FLOOR BACK"

BY RUTH L. CARD

ILLUSTRATED BY R. BRUCE HORSFALL

"AS THEY GREW APACE THE LITTLE ONES WERE FED BIGGER AND BIGGER INSECTS"

It is a bright, sunshiny day in April with a stir of spring in the air. In our household there is great rejoicing, because our regular tenants have just moved into their old quarters in our "third floor back." They've never paid a cent of rent in the eight years they've been with us, but we've looked forward to their return eagerly, nevertheless, and a bit anxiously this year because they're rather elderly to make the long trip by air from their winter home in Florida. We never could quite get the Mister's name; when his wife says it, it sounds like "Peeawee"—perhaps it's "Peter dear," because they're very devoted—but there's no doubt about hers. He calls it over and over again, "Phoebe! Phoebe! Phoebe!" So we've always called them just "Mr. and Mrs. Phoebe."

When we first made their acquaintance, we had just been married and so had they. Our new house was being built, and the steel "I-beam" supporting the sun porch formed a shelf near the ceiling of the garage under it, just wide enough for their nest. As the garage doors had not been put on, they could come and go at will. They were sheltered from storm and wind, and no prowling cat could get near them. But alas for the "best-laid plans"—when the baby birds had hatched out of the four little white eggs, we noticed that they soon drooped listlessly. We found that the nest had become infested with lice from the hen's feathers used in lining it, and the little helpless bodies were being cruelly attacked. Despite our ministrations with a kerosene solution, they all died. Poor young Mr. and Mrs. Phoebe, after a few dejected visits to the scene, left sadly for parts unknown.

Not knowing then much about the habits of these particular birds, what was our surprise and joy to see them return the next spring! Of course the garage was now closed up, but they had explored the exterior of the house thoroughly and found a spot ideally suited to their needs, a shelf formed by the top of one of the square stone posts supporting the roof of the small back porch. It was a cozy little nook about eight inches square, just under the eaves, and weren't they happy and excited when they discovered it! The fact that it was only a few feet from our back door bothered them not at all, so convinced were they of our friendliness.

Busily they set to work. First there must be some beakfuls of wet clay smeared on the rock to cement the nest, then some moss and straws put on this quickly enough to stick. On this foundation they fashioned a beautifully-finished little home of soft grasses woven in and out, with a few threads to hold them firmly. Toward the top they added some hairs to make it strong and fine, and, lastly, a smooth lining of feathers soft as down. When the last feather had been tucked in to suit her, and the inside rounded out to fit her sleek little body, Mrs. Phoebe settled down in it contentedly, while Mr. Phoebe flew gaily off into the woods for a well-earned holiday. Each day he returned "to see how things were going." In between his expeditions in search of nice fat flies, he kept a watchful eye on his little wife. Every noon-time when she flew off the nest and called him—possibly saying, "Peter dear, don't forget your Phoebe—Phoebe!"—he appeared from somewhere near by and off they went companionably to lunch together.

In due course of time, four little Phoebes arrived, heralded by excited chirpings and flutterings. Awkward bits of fuzz they seemed to us, but their mother thought them beautiful. As for Mr. Phoebe, he nearly turned a somersault from sheer exuberance of spirits and kept fly-

"CALLING INSISTENTLY TO HIS WIFE AS HE TEETERS BRISKLY ON MY CLOTHES-LINE IN ANTICIPATION OF A BUSY, HAPPY SUMMER"

ing in and out of the nook under the eaves to look at them.

But bringing up children means lots of hard work, and busily they both set to. Clothes posts and lines in the back yard made convenient observation points. They perched there, balancing themselves with quick flirts of the tail (we could always tell them from other birds, at a distance, by this teetering motion, as if they were always just on the point of losing their balance) and darting out to catch unwary insects on the wing. A quick, bright eye turned from side to side, a glimpse of a tempting fly, a swift sally, a moment's hovering pause in mid-air, a sharp click of the tiny beak (we could hear it quite plainly on a still summer day) and Mr. or Mrs. Phoebe had another morsel to put into one of the wide-open mouths sticking up in the little nest. Newborn baby birds couldn't be expected to digest big flies, wasps and moths, such as mother and father gulped down, so with the top of a clothes post as a convenient chopping board, they carefully cut up these big insects into tiny specks suitable for infant feeding. From inside our door, through the glass panes at the top, we could watch all the details of their family life without disturbing them. Often my own housework was neglected while I admired Mrs. Phoebe's brisk efficiency. She kept the nest as neat as a pin, taking out every dropping, filled the little gaping mouths (with hubby's help), tucked the baby birdies under her wings for their naps, cuddled them warm and snug each night, and after a sociable breakfast with "Peter-dear" at dawn, started in another busy day.

As they grew apace, the little ones were fed bigger and bigger insects, until finally, when they were almost full-grown, we often saw her giving them whole dragon flies or butterflies. Such a comical figure poor little Master Phoebe made with a big "darning needle" sticking half out of his mouth and his mother pushing and poking, quite exasperated because he couldn't get it down faster! Once in a while, when they were good children, she would bring them blueberries for dessert—or perhaps it was when they needed blueberry pills. I never could be quite sure!

Gradually the little bony mites were covered with feathers, speckled and brownish at first; the nest became crowded; they stood up and looked fearfully over the edge; and then came the exciting time when father and mother decided they were old enough to fly. In their inexperience, the young couple urged them off the nest before they were quite strong enough. We saw them fluttering around on the lawn, with mother and father hovering anxiously over them. Since it was dusk we feared prowling cats, so we decided to help out our little friends again. We picked all four babies up, put them in a box with soft grass in the bottom, put a piece of wire screen over it, and left them there for the night, with Mr. and Mrs. Phoebe teetering watchfully on some nearby shrubbery. When we let the youngsters out next morning, they "personally conducted" them out into the wide, wide world.

Having had nothing in the nest to grasp with their toes, the little birdies had to practise clinging to the branches. They landed in all sorts of awkward positions after their first short flights, and hung on desperately, sometimes staying on one twig half an hour before daring to venture further. Mother and Father Phoebe flew encouragingly from one to another, feeding them from time to time as they had done in the nest. It must have been an exciting moment when the first of the little family darted off his perch and really caught a fly all by himself!

The little nest on the post seemed such a lonely spot after the happy family had gone! But about two weeks later, when I glanced up instinctively one day, there sat Mrs. Phoebe as contentedly as could be! She had only gone on a vacation before starting to raise a second family.

Three little ones hatched out this time, but poor Mr. Phoebe was destined for more trouble and sorrow! When the baby birds were about half grown we noticed him flying in and out of the porch with loud, anxious cries of "Phoebe! Phoebe! Phoebe!" and couldn't imagine what he was so worried about. It wasn't until we discovered the little ones dead a few days later that we realized we had seen only one of the adult birds that week. Mr. Phoebe's excitement was all because Mrs. Phoebe had disappeared. Distractedly he fluttered about, in and out

of the nest. He sat on the ridgepole by the hour calling and calling in vain. We could not comfort him and perhaps he still thinks she deserted him and her family for some gay bird-Lothario; but later we discovered her fate. We moved an ice-box that had been left temporarily on the porch. There, wedged behind it, was the body of our poor little friend. She had evidently darted in after a fly, become caught, and struggled in vain to free herself.

We thought we should never see Mr. Phoebe again. "If he finds himself a second wife," we said, "she'll probably want to pick out her own home somewhere else." But no, either Mr. Phoebe was the boss or else he won her by telling her of his lovely summer home, because the next spring he reappeared in fine spirits, looked over the old site, and in a few days came bringing his new wife to see it. The old nest was still there, and after much twittering discussion she said she "just loved the location but wasn't going to live in any old second-hand house," so they built on the top of the opposite post.

The second Mrs. Phoebe proved to be as good a housekeeper and mother as the first, and they raised two healthy families that year. The next year they returned to the same spot—this time I had removed the old nest. Then the following year they decided that our continual coming and going past their nest, and turning on the light over Mrs. Phoebe's head at night, were too disturbing. Perhaps they were developing "nerves" as they got older! So they moved to the "third floor back." This is up under the peak where a framework joist joins the overhang of the roof, making a little shelf. The nest is in sight from our attic window but just out of reach. Here they have lived in peace and comfort for four summers. They work as busily as ever and look as trim, bright-eyed and alert. The only signs of advancing age are that last year they had only two baby birds in each family instead of the usual four, and they used the old nest, freshened up with a few repairs, instead of building a new one—disproving the old proverb that "there are no birds in last year's nest."

Friends whom I have told about these regular tenants of ours often ask, "How do you know they are the same ones?" The birds have no distinguishing marks, but it is their actions which make us sure that they are our old friends coming back each year. Mr. Phoebe always arrives first; three years it has been on the thirty-first of March, and the time never varies more than three or four days. Early in the morning I hear his call of "Phoebe! Phoebe!" He goes at once to the sites of the old nests, fluttering in and out, his every action proclaiming that he is no stranger but a returning householder looking things over before opening up his summer home. He perches on certain favorite trees and shrubs nearby, and on his favorite vantage point, the very peak of the ridgepole. It is a well-known fact in bird-lore, but an unexplained one, that the phoebes mate for life but yet never arrive at their northern home together. Mr. Phoebe is always about three days ahead, and we see him scanning the landscape anxiously in every direction as he calls "Phoebe! Phoebe!" over and over again. Then one day we hear such a twittering and fluttering that we know that Mrs. Phoebe has arrived and we run to the window to witness the joyous reunion!

As I write this, Mr. Phoebe is calling insistently to his wife to "hurry up with those eggs," as he teeters briskly on my clothesline in anticipation of a happy summer.

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A MIRROR FOR LONELINESS

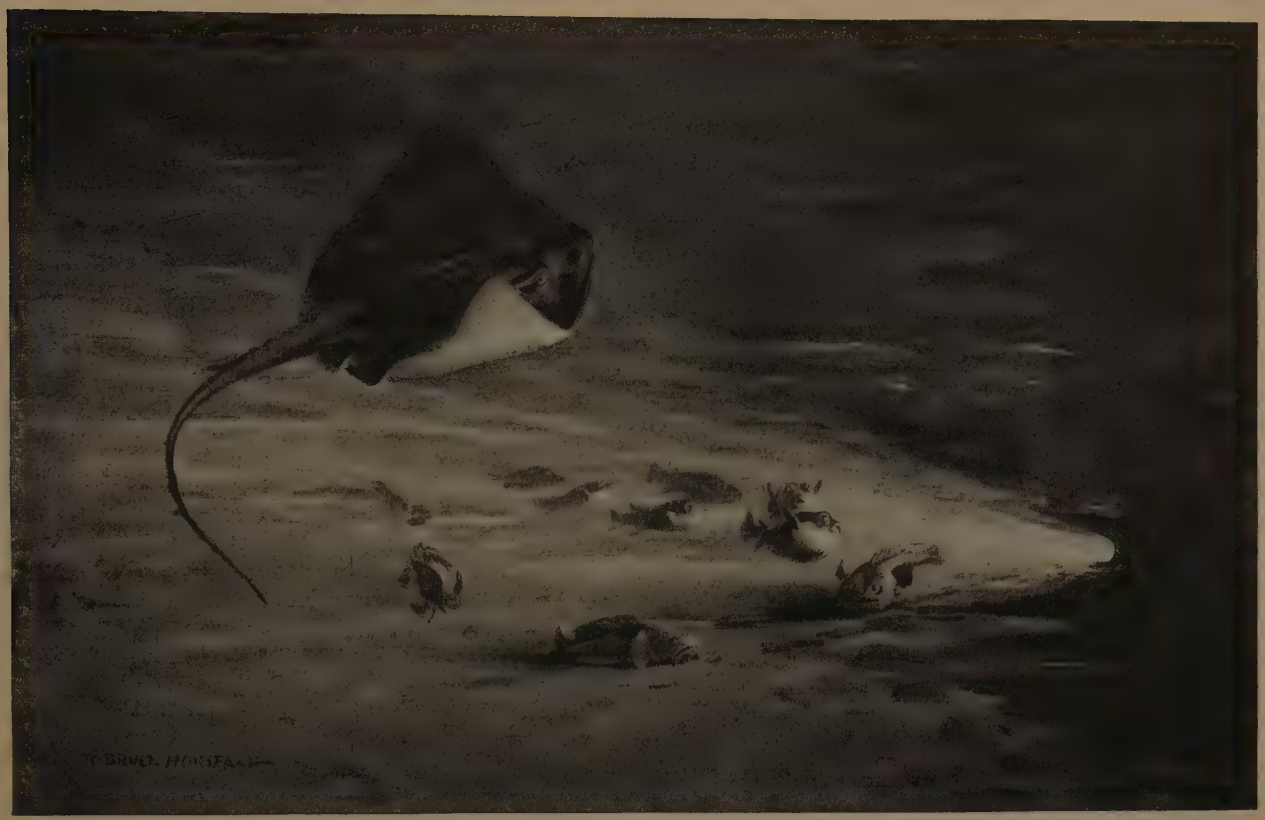
BY HARRIETT C. LEONARD

WHEN one of a pair of parrakeets was taken ill my friends all advised me to have a small mirror ready in case the little thing died. They assured me that the lone little bird would not pine for its mate, but would sit close to the mirror and be content with its own reflection. Although I had misgivings about such a procedure, I did have a mirror ready and my little Judy did die leaving a much worried little Punch. Immediately I placed the mirror near the perch where Punch sat, and tied it securely to the wires of the cage.

Next morning to my amazement little Punch was sitting as close to the mirror as it was possible for him to get. From time to time he chattered to his reflection and seemed perplexed when he received no reply. He ate and drank and to all appearances was quite normal. As far as I could see he had not yet discovered that Judy was gone.

After some few weeks he started pecking at the mirror and trying to see what was on the other side. Twice he succeeded in unfastening the string that held it to the cage. Up to now it had been interesting to watch him, but as his perplexity grew it became very difficult for me to see this little bird sitting for hours at a time so close to what he thought was his much beloved mate.

At last I decided to give him to a friend who had a number of parrakeets, but before I took Punch to his new home I took a picture of him sitting as you see close to the small mirror. I had heard the story of a mirror keeping a bird alive after it had lost its mate but this was my first experience in seeing it work out.



THE CLIMAX COMES WHEN A BIG RAY FLAPS BY

It looks like some watery version of a pterodactyl, among the toadfish with their wide, grinning mouths and the swell fish comically wagging their ridiculous tails

AN UNTOUCHED WORLD

BY GILBERT C. KLINGEL

STANDING on the seashore and gazing oceanward, few of us pause to think that beneath the great expanse of water before us lies a marvelous world as unexplored and remote as the farthest Arctic waste. Here at our very doorstep is a vast region unseen by human eye and peopled with thousands of strange beings of an infinite variety of form. Of their habits and peculiarities we know next to nothing.

It is a primitive, fascinating world, the great barrier to which is pressure. Yet in a modest way the exploration of this virgin territory is open to everyone. A simple diving helmet of metal and glass formed to fit the shoulders, common garden hose, a two-way air pump and some old clothes are all that is necessary. With this simple outfit descents to forty feet are quite safe and practical, and the way is open to new and unexplored areas as interesting as anything in distant Tibet or deepest Africa.

The first trip down is always something of an event. As you slip into the helmet held over the gunwale by a companion the first sensation is of closeness and loss of direction followed by slight bewilderment. Hand over hand you drop gently downwards. The helmet, so heavy above water, is now hardly noticeable. Overhead the surface moves and undulates like a molten mirror. Odd shafts of greenish-yellow light form and disappear, penciling their way downward through the liquid haze. Down and down you drop until your ears begin to hurt from the pressure. A few deep yawns and hard swallows soon relieve the pain, and a moment later, with a sigh of relief, you touch bottom.

You look about, turning ever so slowly like an actor in a slow motion picture. At first you see nothing but the green haze of the water fading away into blankness. Then, at the next quarter turn, a large pear-shaped object comes into view, gleaming with lines of iridescent color. And what colors! Fiery opal reds and gleaming cerulean blues flame the length of the creature and fade out, only to be reborn in newer and more delicate tints. Yet the body of the animal is quite transparent and so filmy that it seems a marvel the flesh holds together. The ctenophore or comb jelly, for such it is, floats out of the line of vision but is replaced by another and still another as a swarm float by. Like the first they all gleam with living color caused by the refraction of the light on their rapidly moving cilia. On the Atlantic Coast these jellies are among the most common objects seen by the diver. In September another type of ctenophore becomes common, the Beroe jellies. They are by far the loveliest of the comb jellies. Tinted

and suffused over their entire bodies with the most exquisite pink and lavender, they are marvels to behold.

Yet not all jellyfish are pleasant to look upon. The stinging varieties with their long trailing tentacles laden with irritating poison darts are sufficiently painful to teach the diver to give them a wide berth. Nevertheless they are interesting objects.

The diver walking about upright will see little other than the jellies, and, now and then, a swimming crab. Perhaps an occasional fish will swim into his ken, but really to become acquainted with the sea life he must get down on his knees and crawl. Better yet is to lie flat on the abdomen, arching the back so the water cannot enter the helmet. If you have picked a nice sandy bottom you will find it worthy of much attention. It will be pitted and marked where various creatures have moved over it. There will be long furrows left by feeding fishes, queer hieroglyphics traced by moving crabs and an occasional hole that will merit investigation.

THE GURNARDS ARE UNDERWATER PERSONALITIES

They walk, and walking fishes are still something of a novelty. They use the first three rays of their pectorals for walking

Suddenly, to your immense surprise, a portion of the bottom will detach itself, skitter away for several feet and settle in a flurry of sand. You creep up to the flounder, for such it is, and try to seize it. Before your fingers touch it it is gone again. The protective coloration of the creatures is remarkable. When lying on the bottom they are all but imperceptible.

The possibilities of bottom-crawling are infinite. From flounders we turn our attention to a vivid cluster of scarlet finger sponge attached to a group of oysters. Our underwater similes bring to mind flowers in a rock garden. Daintily moving in the lee of the sponge appears a small fish with a large quizzical "face", which we recognize as a gurnard or sea robin. The gurnards are underwater personalities not to be passed lightly. They walk, and walking fishes are still something of a novelty. The first three rays of the pectorals are much developed, separated from the remainder of the fin and are used as legs. With fins quiet and the free rays moving one after the other the gurnard steps delicately up to our fingers and examines them thoroughly. It seems most curious because it will stay around for minutes at a time watching our every action. But make a sudden movement, the "legs" are folded up out of the way and once again the fins assume their proper duties and the fish swims away.

Let us vary our bottom-crawling by carrying with us a loose mesh bag full of bait. Crushed crabs and partly decayed fish are suitable. Soon you will be the excited center of attraction for hosts of small fishes, spots, perches, croakers and others. They seem not the least afraid but are intent on the bait. Suddenly without warning they all flash out of sight. Puzzled, you look about for the reason. In a moment you understand when a large green eel glides by and disappears in back of you. In a short time it returns and voraciously attacks the dead fish. The beast tears and noses into the soft flesh chewing out big hunks and devouring them in rapid gulps. You are vividly reminded that the sea is still the most primitive place on earth. The eel's only thought is of food. You are totally disregarded. The creature even turns its back and the tail waves back and forth against the glass of your helmet.

Yet somehow there is something of beauty and grace about the scene despite its repulsiveness. The movements of the eel are undoubtedly graceful and its colors are of a pastel loveliness, particularly the stomach and undersides seen when the beast rolls over better to reach its food. Overall the white flesh is the faintest pearly sheen touched with iridescent pink. This fades into the soft greens and browns of the back and sides. All of which goes to show that there is a little beauty in most everything.

It is always a temptation for the curious diver to go down a bit farther and then a bit farther. The farthest anemones are always the largest. To satisfy this desire we decided one day to go as deep as we dared. We selected an old rotten fish pole as the scene of the adventure be-

cause we felt it would provide interest while we were ascending and descending.

My companion went first. He was gone some time and came to the surface reporting beautiful anemones and barnacles growing near the bottom. He was somewhat dizzy and disturbed from the pressure.

When my turn came I worked my way over to the pole and slowly, hand over hand, descended. The pole was covered with anemones, their tentacles outspread like the petals of so many flowers. The barnacles were busy feeding with their feathered cirri which they moved rhythmically back and forth. About twenty feet down I passed a blue crab hanging to the pole. It seemed reluctant to leave and menaced me with its claws. Finally it sped away and disappeared.

The surface was no longer visible and I was surrounded by a light green haze somewhat lighter above than below. About halfway a strong tide streamed me out on the end of my rope like a rag in a breeze. Foolishly I struggled against it to keep close to the pole and was soon panting heavily. The pressure was now very noticeable. I kept going until my feet touched bottom—soft oozy mud. The scene was mysterious. Below all was blackness, above ever so gently the water became lighter and lighter until it diffused into a pale green opalescence. In the center was the piling softened by the maze of anemones. Above and below it faded into nothingness.

THE AUTHOR IN THE HELMET
The heavy clothing is worn as protection against the stinging nettles

I began to ascend. Still breathing hard, I was feeling slightly dizzy. Slowly I went up. On the way I passed a pair of crabs, arrivals since the descent. They held up their claws at me as I passed. However, I was becoming so dizzy I did not tarry. I finally reached the surface and weakly climbed into the boat.

When all else palls and one feels bored with the world and his surroundings, might I suggest donning a diving helmet and sallying forth at night. Herein lies still another world.

Select one of those soft summer evenings when the air is warm and still and the water glows and gleams with phosphorescence. One of those evenings when every stroke of the oars creates a swirl of fire and the wake of your boat trails out in greenish incandescence. Take into your hand a waterproof flashlight and sink slowly beneath the surface. The rays of the flash cast a weird and definite beam. On each side is solid blackness. Overhead a faint radiance shows the position of the boat. Turn the light off.

Against an ink black background millions of tiny sparks flash into being and as quickly die out. The effect is that of a Fourth of July sparkler minus the glowing wire. An occasional comb jelly bumping against the rope will burst into a flame of bluish green and fade away. It is all weird and, unless your nerves are good, you may flinch when a jelly flares against the glass of your helmet.

Now move your hands and swish the rope. Immediately they become visible, outlined in liquid fire which casts a soft glow through the water. Be quiet and once again all is blackness relieved by the millions of microscopic sparks, each the excited flaring up of a creature as alive, if not as highly organized, as you or I. When we realize that every inch of this water for miles and miles around, up and down and about, holds its quota of living moving organisms each capable of glowing with cold living light, we can only be silent with wonder and awe.

Let us turn our light on again. What are those white and reddish streaks flashing rapidly back and forth across the beam? Crustaceans! Shrimp, prawn, copepods and divers others streak in erratic flights along the length of the light. It seems to have a fascination for them because they bump into the glass—hundreds of them until the cone of light becomes a whirling twisting vortex of organisms. Soon bright silvery flashes reveal the presence of fishes that in increasing numbers come to feed on the unexpected manna of light-crazed crustacea. Back and forth the fishes move, greedily gulping the crustaceans but themselves fascinated by the light for they stop and gaze fixedly at this strange thing as if filled with overpowering curiosity.

Suddenly the crustacea are eclipsed as a horde of menhaden pour past—motes of gleaming silver ranged row after row in military precision—wheeling right and then left as if commanded by some invisible leader. The silvery sheen of their scales visibly lights up the water and flares and dims as the flash catches the scales at right angles or obliquely. And as quickly as they appeared they are gone.

As the moments pass the drama becomes more and more fascinating. The fishes become more numerous and larger. The little ones attract the big ones. Toadfish put in appearance, brown ugly things with wide grinning mouths. Swell fish comically wag their ridiculous tails. The climax arrives when a big skate or ray flaps by looking like some watery version of a pterodactyl. You shiver, partly from cold and partly from nervousness, realize that this is not your world and that you have stayed long enough.

NENA IS A JUTIA AND SHE LOOKS LIKE A COMBINATION OF FOX SQUIRREL, RAT AND KANGAROO AND DOES NOT ENJOY POPULARITY WITH THE LADIES

HERE SHE HAS FOUND A CIGAR BUTT AND IS INDULGING HERSELF IN A LIKING FOR TOBACCO, AN ITEM WHICH IS NOT ORDINARILY ALLOWED TO HER

NENA

BY KATHLEEN HILL BUCHER

"NENA, come a-running!" and Nena comes loping, shambling or galloping just like a little bear, her chain rattling and clinking against anything along the way. Up she rushes, stands and embraces one's leg with her little black paws, and whiffles to be scratched and rubbed.

Nena is our latest and most amusing pet. Her native name is "jutia" (pronounced in English who-tee-ah and sometimes spelled hutia) and her scientific name is *Capromys pilorides*. She looks like a combination of fox-squirrel, rat and kangaroo. Persons who are afraid of rats, shrink from her. Two ladies who were visiting here did more than shrink when we brought Nena in to entertain them. They jumped upon chairs, squealed, screwed up their eyes and jammed their arms tight to their skirts.

When Nena stands on her hind legs she is about sixteen inches high. When she walks she is about eighteen inches long including tail. It is impossible to take accurate measurements of her because she wants the ruler or tape and snatches them to play with. She is not full-grown, and is playful like a kitten. She loves to be scratched underneath but not on top. When we put our hands on her back, she nips and chatters, but when we scratch her stomach, she turns on her back, all four feet in the air or curled around the hand, and grunts with contentment. She does not like to be picked up, but prefers to have an arm put down for her to scramble up. She does not like to be carried, but wants to sit on one's shoulder, balancing herself with her stiff gray tail against one's neck or chin, or under one's nose.

NENA HAVING A SNACK

She eats standing upright on her hind legs and holding the food between her paws

The fox terrier, Nelson, and Nena have boxing matches. When she rears up on her hind legs, she is nearly as tall as he and can box his jaws and shoulders with both paws. She can stand on her hind legs, using her tail as a prop, and jump from side to side or walk backward, looking like a performing bear. Nelson is complacent about the boxing and pats her gently with one paw. Often when Nena

is eating, he will steal her food, even if it is something that he does not like, considering, perhaps, that he is being neglected, and is now the second latest pet. When he, the deer hound, Scamp, and the old black mongrel, Topsy, lie down to rest within reach of her chain, she climbs over them until she is tired, then throws herself on the floor, belly down, all paws spread out like a flying squirrel in flight, in an attitude of complete fatigue.

Nena's favorite tid-bit is tobacco in any form. She is forbidden to eat it—I don't know why, age, maybe. If she finds a bit she betrays herself like a naughty child, by scolding and fussing like an angry squirrel. One day, finding a cigar butt, she began to nibble and to scold viciously. When my husband saw her, he tried to take it from her and she drove her four incisors through his finger beside the nail. The incisors are very long, thin and yellowish, like those of a rat, and must be worn down on account of their rapid growth. We give her fresh branches and sugar cane to gnaw, but she gnaws everything that she touches. There are little nips taken out all over the wicker furniture, the dogs' collars, my shoes, and the whole inside of her cage.

Lettuce, tomatoes, cabbage, nuts, bread, oranges, any fruit or vegetable, in fact, she will eat. Her favorite delicacies are roses and a big crisp cracker that we call *galleta de Cristina*. We have never seen her drink, but she will sniffle over drops of water as though she might take them up. Perhaps, living in the woods, the jutias drink dew or rain drops. We give her succulent leaves and juicy fruits every day to take the place of water.

NENA LIKES A BOXING MATCH

One sparring partner is the fox terrier but above she has taken on a human. She props herself with her tail and can jump from side to side. Below she is in a papaya tree. Note the prehensile tail, handy for tree climbing.

There are four kinds of jutias. This is the small kind and is easily tamed but seldom amiable. The others are larger and ferocious and cannot be domesticated.

The French consul in Santiago de Cuba had one for eight years. It was chained on the front verandah and was so fierce that it used to dart out of its box and attack anyone who came within reach. If beggars or unwanted people came around, the family used to sick "Gutie" (from Aguti) on them. She would shriek shrilly and angrily and no one dared approach.

The other day Nena slipped off the ring of her chain from the post and disappeared. I was alarmed, but I imitated my husband's "come-a-running" call, and out she popped from under the back porch, with her long black luxurious whiskers waving, her pale gray face full of interest, to see what I had for her. I gave her a cracker and she let me chain her again. Today she broke her chain and Harold, our younger son, found her on top of the cypress rain-water tank. How she got there we do not know, unless she climbed up a croton or a hibiscus tree. He coaxed her down with a chunk of coconut meat.

When she is given something to eat she stands upright on her hind legs and takes the food in her forepaws. If it is a little piece she holds it in one paw with her four black fingers and a little nubbin of a rudimentary thumb. As she eats she bends forward, lower and lower until finally she rests the food on the ground and becomes a quadruped once more.

The most amusing habit she has is her washing. She spits all over her paws, then rubs them briskly *once* behind her ears, over her forehead, down her whiskers, a swipe down her sides and the bath-and-

combing is finished in brief but truly efficient fashion.

Nena sleeps at night in a box with a zinc roof and chicken wire front. She has a small box inside with a blanket for bed. She does not like to get up early, but loves to lie lazily in the early sunlight yawning and stretching. About mid-morning, when she is hungry, she chatters to be taken out. Then she is chained to an iron pipe in the back passage where she cannot hang herself and is petted and fed all day long by everyone who passes. Her greatest pleasure is a trip into the house, where she sniffs and nibbles everything and charges up and down the hall until she is tired and takes her siesta.

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GROWING THE TROUT LILY

BY BESSIE L. PUTNAM

ADDER'S-TONGUE and dogtooth violet, the older botanies call this beautiful lily-like flower, though why, no one seems to know. The more recent popular nomenclature is evidently the more acceptable and more inviting. The spotted leaves are quite suggestive of the fish that is uppermost in the mind of the angler at this season, and the two love the same haunts.

The yellow trout lily blossoms before the spring beauty flowers are gone. It is easily recognized by the satiny pied leaves, a mingling of brown and purplish with green, and its lily-like flowers. The latter are clear yellow within and fawn color without, a fact which, coupled with the fancied semblance of the young leaves to the erect ears of a startled fawn, led Burroughs to suggest the poetic title of fawn lily. An allied species more common in the west has white flowers and leaves less strikingly mottled, but is otherwise quite similar. Notice that every time one of these flowers is picked its two leaves are naturally taken with it—all that it can ever produce. But one may dig up the entire plant and through re-planting give it a new lease of life.

PHOTOGRAPH BY E. M. KITTREDGE

YELLOW ADDER'S TONGUE OR TROUT LILY

An attractive wild flower in its native habitat, it should be gathered only in moderation but may be cultivated

The root is a corm, growing as far below the surface as the leaves extend above it. Seedling corms have a single leaf. Plants of blooming size always have two leaves of unequal size. How do the young corms ever reach the deeper soil in which the mature ones are always rooted? Dig down in August on the knoll which you marked as covered with the plants in April. Each corm is at this time sending downward a shining white fiber, at the end of which will eventually grow, deeper still, a newer and larger corm, after which process the old one will die.

In our own locality, northwestern Pennsylvania, the yellow trout lily is common in rich woods with slightly acid soil, growing in communities several feet square so plentifully that one can scarcely step without crushing plants. It persists in clearings and seeds freely.

We have always transplanted it when in bloom and have found its culture easy. However, the safer way is to wait until the fading leaves show that the corm is approaching maturity; or better still, if removed from its native home, to mark the spot and take up the corms in June. One will have to dig deep, from six to fifteen inches, depending upon the age of the plants. Complaint has been made that it does not bloom well in cultivation. If one examines a woodland knoll covered with plants he will find comparatively few of blooming size, the majority showing only a single leaf. So we have never felt that the plants in cultivation are shier bloomers in comparison. More, they thrive in sunshine as well as shade, although the beautifully spotted leaves are perhaps shorter lived.

In spite of its profuse growth in our own vicinity, this is one of the flowers that the Wild Flower Preservation Society lists as permissible of picking *in moderation only,* providing plenty of flowers are left to mature seed. In the same list we find Dutchman's-breeches, a plant easily cultivated but which was exterminated from our own locality before the recollection of the writer. This brings us back to the rule that even moderate picking should be indulged in with discretion and in accordance with local conditions. Any species locally rare should be treated as a rare plant, though plentiful ten or even five miles away.

WILD CARROT

BY F. LAMSON-SCRIBNER

PHOTOGRAPHS BY THE AUTHOR

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LIKE many other plants that have followed us from Europe, wild carrot has not proved to be a desirable acquisition to this country. It has an aggressive habit of pushing itself into places where it is not wanted, crowding out more desirable plants until it has become one of the most widespread of our common weeds. Its range now extends across our country from ocean to ocean.

Wild carrot is a member of the great Parsley family, the Umbelliferae. To this family belong the wild parsnip, the fetid and poisonous fool's parsley and the poison hemlock, all of which have come to America from Europe, and, like the wild carrot, are now widely distributed and fully naturalized here.

Wild carrot is a stout, biennial, herbaceous plant, which during the first year produces only a thick rosette of finely divided, feathery leaves that lie flat on the ground, crowning the long, tapering root. The second year it sends up its branching flower stalks that grow to the height of two or three feet. These are covered with rather stiff bristly hairs and are sparingly leafy. From June to September is the blooming period, when the flowers appear, thousands of them on a single plant, all neatly arranged in broad compound umbels at the tips of the gracefully spreading branches. At this time the plant becomes very attractive and may be classed with those flowers "that minister delight to man and beautify the earth."

Because of its aggressive habits and weedy growth, it has been called "Devil's Plague" by some. But lovers of flowers will see in the charming delicacy of its myriads of tiny snow-white flowers, disposed in wonderfully symmetrical umbels, a subject deserving a better name—to them it is "Queen Anne's Lace." If one examines the flower cluster closely he will see in its very center a small

dark purple floret that suggests a little jewel placed there by Nature's hand to add a delicate finishing touch to the clever lace-like design of the entire floral arrangement. It will be noticed that the outer florets are slightly larger than those nearer the center.

When in full bloom the umbels are slightly convex above; later they change in outline until they are deeply concave, the outer rays becoming erect, and, infolding at their tips, change the entire appearance to that of a tiny bird's nest. Many know the plant as "Bird's Nest Weed"—adding a third English name to our wild carrot.

SEEDS OF THE WILD CARROT
Being very light they are carried widely by the wind and their spikes allow them to attach to the fur of animals and spread

The eggs in this "bird's nest" are the fruits or seeds of the plant, each fruit consisting of two carpels which are curious and interesting objects when viewed under a magnifier. The rounded backs of the carpels, which are easily separable, have a number of bristly primary ribs, and four secondary winged ribs, each of the latter bearing a single row of rather stout barbed prickles. Beneath these larger ribs are minute tubes which contain the aromatic oil that is peculiar to this plant.

The seeds retain their vitality for an indefinite period and, being very light, are blown about and scattered by the wind. The pointed and barbed bristles on the seeds are a further aid to their distribution by causing them to catch on to any moving object, either man or beast.

The dispersion of the seeds is thus well insured and neglected meadows often demonstrate this fact by the appearance of a vigorous stand of wild carrot that, in blooming season, may spread over the field covering the entire surface with a lacy snow-white mantle.

When meadows are thus overrun by Queen Anne's Lace, its weedy character is apparent because such meadows are worthless for pasture or for hay, the plant being too coarse and too bitter to be eaten by stock of any kind. Such conditions, however, exist only in neglected fields. Under proper tillage and care the plant soon disappears from arable lands.

When growing by the roadside it is no longer a plant out of place, no longer a weed, because, here, during its blooming season, it has a distinct and useful purpose in delighting the eye and gives pleasure to every passing traveller.

The wild carrot is believed to have had its origin in southern Europe, but it is now distributed throughout the temperate countries of the world. It is regarded as the progenitor, through selection and cultivation, of the well known garden vegetable. European seedsmen now enumerate about thirty distinct horticultural varieties, the eating of which tradition prescribes to beautify the complexion and add roses to the cheeks of those who partake.

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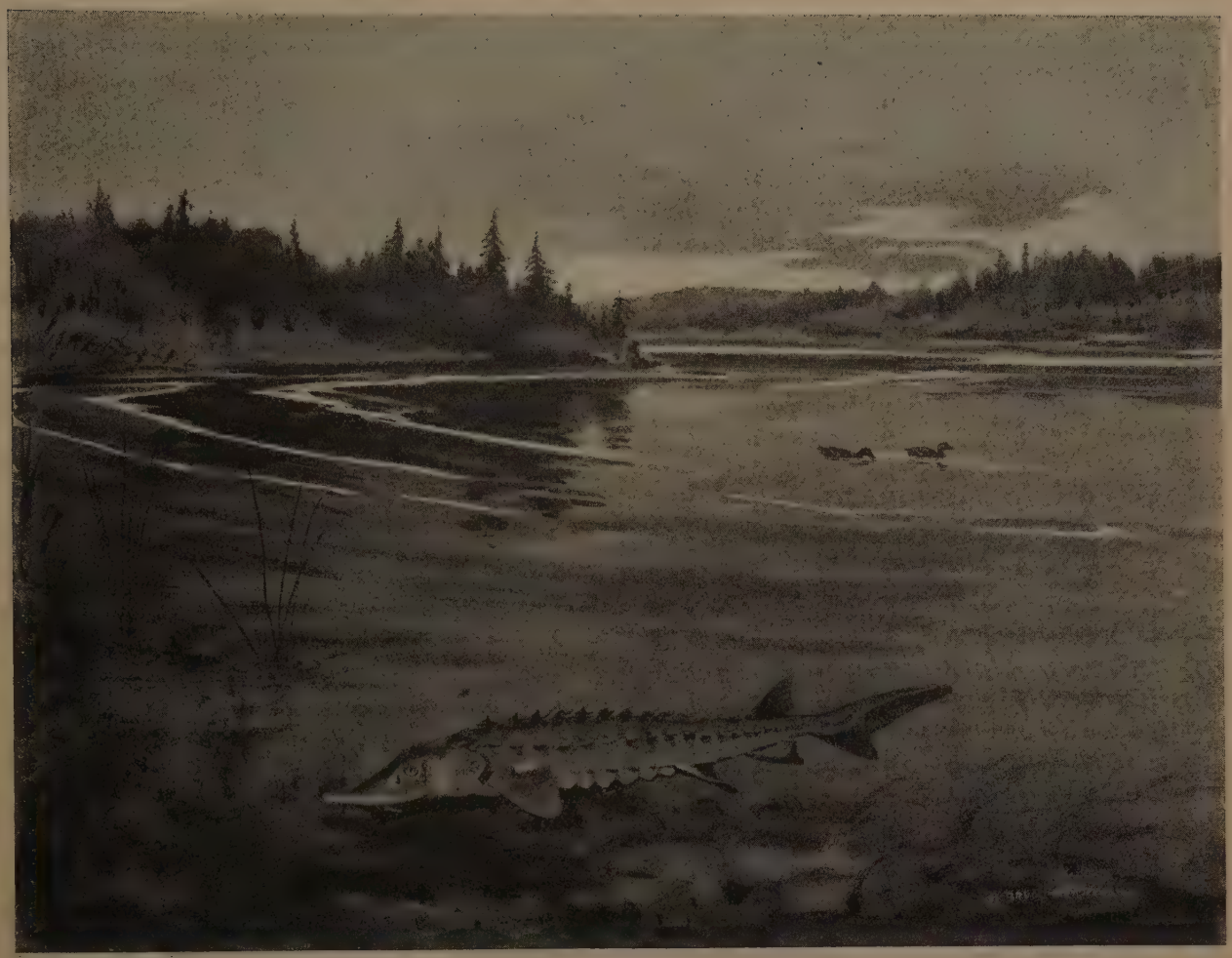
STARLINGS IN THE ICE BOX

BY ORRILLA F. O'CLAIR

At the summer cottage everything had been left in order for the long winter. The refrigerator on the back porch had been thoroughly cleaned, and the lid propped open slightly more than an inch.

Then came summer and the Putnams eagerly drove to the country to open up the house. All was well except the ice box. Through the scant opening a starling and his mate had brought an unbelievable amount of material for their nest. They seemed to have felt that they must fill this white mansion with nesting material. They even brought twigs a foot long and a quarter of an inch in diameter. They brought many poplar leaves and a bushel basket full of dried grass. At the back of this pile they had swirled together a nest which contained five eggs when discovered. Two more eggs were found at the bottom of the ice box when this gargantuan bird home was discovered. Many people inspected this nest in the ice box and after it was removed to the wheelbarrow, and all left with a great respect for the birds' industry, at least.



ADULT STURGEONS HAVE A WIDE RANGE IN SIZE
They have been recorded from two and one-half feet to thirty feet in length and have weighed as much as three thousand pounds, which is a lot of fish

THE DRAMA OF THE STURGEON

ITS DECLINE PROVIDES A MORAL IN FISH CONSERVATION

BY H. REVELL WHITRIDGE

PUT a mercenary value on any natural product that must multiply itself; make no laws, or have no drastic, constructive enforcement of the laws, and you soon have depletion of the natural product through ignorance and greed.

Plain ignorance is seldom malicious, and may often be overcome by a constructive program of conservation and an appeal to man's sportsmanship. Greed, I fear, can be met only by drastic laws.

To the sporting fisherman who uses the multitude of colorful flies, spinners, plugs or spoons, or even lively minnows for bait, the sturgeon is certainly of little moment as a fish. But the drama of the sturgeon should prove a great lesson not only to fishermen, but to hunters as well, because it is another vivid example of the need for the protection of all valuable life.

Recently I was reading a magazine which carries a department of free information. I was interested in one inquiry. A lady whose sons wanted to go up to the French River, just off Georgian Bay, inquired whether there was still fishing for sturgeon off Bustard Lights. The reply, in part, was that fishing for sturgeon is still carried on, but not in that particular place. She was advised that sturgeon are becoming scarcer and scarcer, although a colony of fishermen in that section fish the year round for sturgeon, and make their living thereby.

Now sturgeon is a fish, and I am interested in all fish and their conservation. So I started checking up on just what I knew about this species, and upon the story of its decline. I discovered that my knowledge of sturgeon was limited to those I had seen in aquariums, one fair-sized sturgeon I had seen close up at Traverse City, Michigan, last summer, and caviar—that expensive food made from the roe of the sturgeon.

As to what I found out concerning the sturgeon's appearance, species, varieties and habits, more later. Con-

cerning the story of the decline of this leviathan of fresh waters and of his salt water cousin, here are my findings—findings so dramatic that they accentuate the need for the conservation of all life that has value. The statistics first. They should not bore you. They are too startling.

In 1888 the sturgeon catch exceeded 17,000,000 pounds, in all American waters. In 1930 the entire catch weighed 2,060,699 pounds. In 1893, according to the Bulletin of the United States Fish Commission, the product of the fisheries of the Great Lakes alone for sturgeon was as follows: New York, 2,251,416 pounds; Pennsylvania, 105,750 pounds; Ohio, 230,493 pounds; Michigan, 1,480,256 pounds; Indiana, 70,716 pounds; Illinois, 16,480 pounds; Wisconsin 134,-648 pounds—a total of 4,289,-759 pounds.

By 1908 the production of the Great Lakes had fallen to a total of 261,500 pounds. In 1930 the Great Lakes produced but 43,-000 pounds. The price of sturgeon and sturgeon roe (caviar) has certainly had nothing to do with the decline in the catch, because the fish continues to be of great value today. One fish caught in 1923, 10 feet, 3 inches long, weighing 450 pounds when taken from the water, yielded 103 pounds of roe, and the roe sold at $2.75 a pound. This single fish brought $350.00.

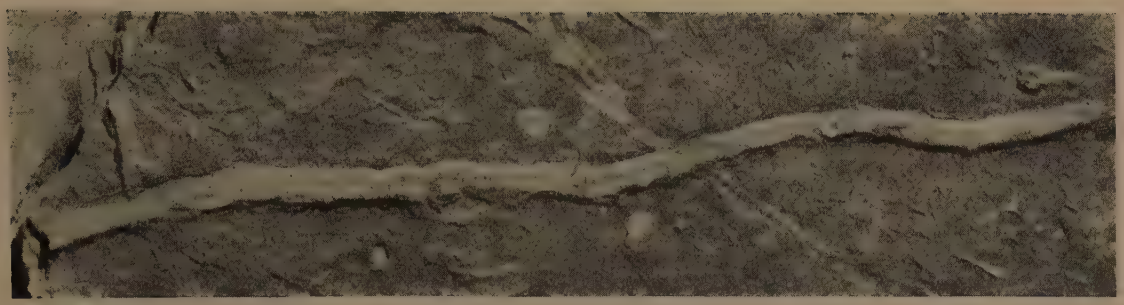
THE STURGEON IS A BOTTOM FEEDER
It likes a diet of earthworms, crustaceans and vegetation. Its mouth is under its head and sucks up food from the bottom

The fact is that sturgeon fishing has been a cold, murderous process. In the early days of the East Coast, the sturgeon was considered of little value. It was extremely plentiful in runs up the Hudson River, and was termed Albany beef. In all the rivers and seas in which salmon are found, sturgeon were plentiful. They ranged in length from two and a half to thirty feet. Then came the demand for caviar. A large industry grew up around the sturgeon, so that a generation ago sturgeon fishing was one of the most important enterprises in many places along the Atlantic seaboard. It paid exceptionally well, with roe at $60 to $120 a keg. In 1888 a single caviar packer on the Delaware River shipped to Europe about 100,000 pounds of fresh caviar.

The demand was great, the prices were high, and the laws were lax. Ignorance and greed entered the game. Fishermen destroyed the sturgeon by overfishing, by beating to death (for such was their practice) any young sturgeon which became entangled in their nets, and by the indiscriminate slaughter of the fish as they ascended the rivers in spawning time.

Because of the relatively confined areas in which sturgeon spawn, and the high value placed on their eggs, overfishing has been easily accomplished. The concentration of pollution about the lower reaches of so many of our rivers has also greatly aided in the work of destruction. As far back as 1875, we find Seth Green interested in experiments with sturgeon eggs for propagation. Others experimenting were Professor Ryder, in 1888; William Lanz, in 1890; Bashford Dean, in 1893. Other attempts have been made in the United States at various times to propagate the sturgeon by artificial manipulation of the eggs, but in every instance they have been rendered practically null by certain unusually persistent difficulties.

I am surprised at the number of my friends who have never seen a sturgeon, and whose knowledge about the fish is nil. It is a big, shark (Continued on page 302)



THE BURROW OF A MARINE WORM DATING BACK INTO HISTORY

This fossil found in the red sandstone of the Niagara Gorge was first identified as a fossil plant and was given the name of Arthrophycus, meaning "jointed seaweed"

TRAILS OF LOST SHORES

BY CARROLL LANE FENTON

Late in the Carboniferous Age, a snail burrowed in the wet sand of a shallow Texas bay. The sand was made stiff by a mixture of mud, so that although the burrow partly collapsed it still remained to be fossilized. Today, in a museum case, it records the ways of a vanished snail that burrowed in search of food two hundred million years ago.

There are many such fossil burrows and trails. The most ancient snails known in the world left trails on the sands of a beach not far from present-day Lake Louise. Far older than these are burrows of worms preserved in hard, brownish rock near a pass in Glacier National Park. With an age of six hundred million years, they are the oldest worms in America—and will be until some lucky find affords fossils of still greater age.

Not all formations are equally rich in these records of ancient life. Sandstones, like some in western New York, often contain abundant burrows. Trails may be found on muddy limes. Not far from Cincinnati are beds which show where small clams crawled and ate, although their shells dissolved before fossilization. Certain Texas snails liked to crawl in loops, and their trails survived in muddy sands that hardened through hundreds of millions of years. Chalk Age crustaceans dug deep holes in mud; when filled, those holes preserved marks of the maker's claws, a sort of autograph, in rock that now is dark gray shale.

Far down in the Niagara Gorge are beds of red, muddy sand laid down during Silurian times. Some beds are covered with tiny shells, lying where they were swept ashore by waves that broke upon the sand. Other are checked by a criss-cross of cracks; such cracks as we see forming today when mud is left in the sun to dry. Many slabs bear deeply notched ridges or ribs, the filled burrows of jointed worms that contracted and swelled as they moved. At each movement they swallowed mouthfuls of mud from which they digested bits of food before throwing the waste grains away. Thus they filled their freshly made holes, building their own fossils while they ate.

THE GEOLOGIST MAKES A FIND

His busy hammer knocks loose the stones and reveals this fossil of an ancient worm's retreat

Fifty and more years ago, such burrows were called fossil plants which geologists knew as "Fucoids." In technical monographs they were described and named: the burrows of the Niagara Gorge became *Arthrophycus* or "Jointed Seaweed." Latin names even were given to marks made by currents and waves, or by the drying of exposed mud. *Fucoides auriformis,* the "Ear-shaped Seaweed" was the sandy deposit filling pits dug by swirling undertow.

When fossil hunters went to the shore, they learned how rarely seaweeds are preserved in any except compact muds. They also found what their "fossils" were—and discovered that trails, burrows or current-marks

AN ANCIENT AMPHIBIAN
This one is called Cacops and is one of those that made some of the trails in the Grand Canyon

might mean more than the supposed imprints of plants. As plants, they were species to be named, and not very good species at that; as trails, they were both animals and records of active though vanished life that can be known no other way. Had we only the shell of that Texas snail, we might think it crawled upon sand or mud; from its burrow, we know that it dug in fine sand as the olive-shell does today in bays along the Pacific Coast. Of course, its species remains unknown—but more species already are named than we can learn in a good long life that should go to the study of more enlivening things.

The fossil hunter whose hobby is trails must do more than hammer at ancient rocks. With camera, notebook, sketch-pad and spade, he rambles about modern shores. On a tidal flat he digs up worms, or watches while they cast mud forth into little, spiral mounds. He wades shallow bays where snails burrow and ghost-shrimps dig; from muds that smell worse than antique eggs, he turns up cubic yards of muck to study the half-dissolved shells of clams that make such unsavory spots their home. And when waves break, he watches the sand to see how it is thrown into swirls that earlier scientists mistook for plants, but which seem to mean much more today as records of early shallows and shores where life chiefly was lived in holes, or on flats where only trails remained when the animals that made them died.

Trail hunters also must take to land and study the ways of four-footed things. In the Grand Canyon are beds of sand which seem to be fossil dunes, with one-time moist stretches between. Across them waddled a constant train of reptiles and amphibians, leaving their footprints in the sand, where they were covered over and fossilized. But here is something no one has explained: those footprints always point one way, none of the creatures that took these paths following them on his return. But why should they choose a different route? If they didn't, what became of those who so often went but never returned?

The earliest footprint of all was left by a salamander-like beast as he walked along a Pennsylvania shore. Did he come down to that shore to feed, or did he crawl there because it gave easier travel than tangled woods of club-mosses and ferns? A good many people would like to know because the answer will tell us the ways of life of a creature about which little is known.

By far the most famous tracks, of course, are those left by dinosaurs. In Massachusetts and Connecticut are beds formed by rivers at flood in the first part of the Age of Reptiles. As flood waters left, dinosaurs came, their big, bird-like feet sinking deep into the wet, sandy mud. Sometimes one of the beasts sat down, leaving the mark of his powerful tail behind the impressions of large, clawed feet. So varied and distinct are the tracks that many kinds, or species, may be recognized although their skeletons remain unknown.

We think of dinosaurs as beasts that lived in subtropical woods, or wallowed in plant-filled swamps. So they

A GEOLOGIST AT HER WORK
Among the shales and jumbled rocks of a western mountainside, she uncovers relics of a bygone age

were—and dinosaur tracks in the North are proofs of one-time sunny climes in regions that are cold today. When geologists found such tracks near Hudson Hope, British Columbia, they were able to picture Chalk Age lakes bordered by rich forests and swamps where dying plants built layers of peat. From these forests, long-necked reptiles came to wander about on the muddy flats left bare by periods of drought. When frightened, they sometimes ran, leaving tracks showing the speed with which they managed to escape. Others wandered far from shore into banks of mud so soft it stuck to their feet and left irregular, saucer-shaped holes each time they took a step. Those holes also remain, fossils that are not dinosaurs, yet that show what dinosaurs found and did when western Canada was as warm as Florida is today.

THE PATH OF A COAL AGE SNAIL
It crawled beneath Texas sands. It left this story of its burrowing habits like the olive shell of today

Where shall we look for fossil trails? There is no special place: dinosaur tracks lie in New Jersey as well as sub-arctic Canada, while worms burrowed in what now is New York and also in Arizona. Where shallows covered sands or muds, where rivers overflowed broad plains—there things that walked, burrowed or crawled left records of their travels to be preserved in hardening rocks. We look, not for regions, but for mud- or sand-stones when we go in search of ancient trails. For what was then water may now be the driest of lands, or the hardest of rocks.

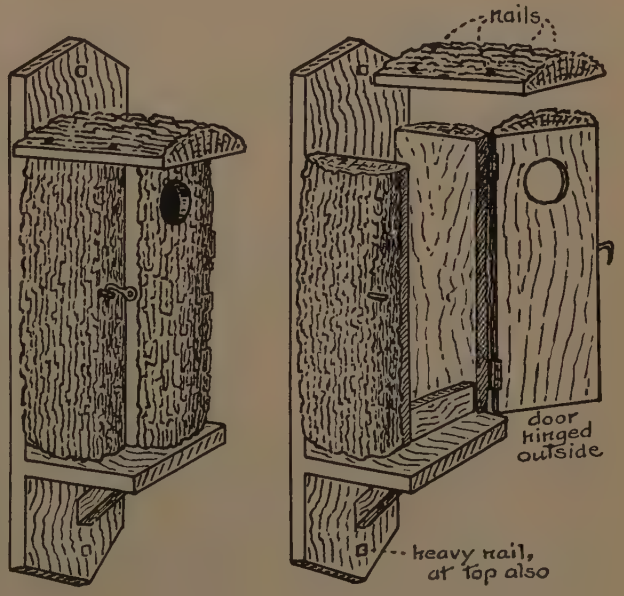
INVITING FLICKERS

BY S. F. AARON

THE golden-wing, yarrup, high-holer—call that beautiful, friendly, useful bird what you will—is less inclined toward human associations than most of our more familiar species. It does not hesitate to breed in remote forests and wilder sections. Its great strength, chisel bill and courageous if peaceful disposition make this happy bird more fearless of small, predatory foes than most of the birds attracted to the haunts of mankind. Yet the independence of the flicker and its greater opportunity for varied foods cause it to be familiar near house and garden and grove.

To attract the flickers by providing a nesting time abode where its cheery call may often be heard and its flashing golden color seen to best advantage we must cater to it with more care than is given to other birds. Although often preferring to construct their own nests, even to the extent of cutting deep holes in hard wood, flickers will often, as though for variation from hard labor—or is it the older birds that so choose?—adopt ready-made nesting places. Highly natural conditions must be observed to furnish them in a form to tempt these birds. Again, to tempt them to return year after year and to take up the same abode, these homes should be kept clean.

Slabs of any wood, with the bark tacked on with brads, the front hinged and the top piece or roof sufficiently



overlapping and sloping to keep the interior dry, make an apartment ready for any flicker's approval. The nesting box should be placed not less than ten feet above the ground—twenty feet or more is better—and should be cleaned out thoroughly each winter season. If near the human dwelling sparrows and starlings may roost in it, but, since the flickers may also want it at any time, it should not be closed. Extreme measures may be necessary to deal with the common intruders, if we prefer flickers.

Organized hiking is a development of the past few years but it has grown rapidly into a major outdoor activity. Thousands of men and women have found in this a healthful and stimulating recreation, a constructive use of leisure and a means to the development of worthwhile comradeship. There is, however, no existing national clearing house or figurative meeting place for these hikers. Therefore it is with a twofold purpose in mind that the editors of Nature Magazine present this first of three articles on hiking. The first purpose is, of course, to publish articles of interest to these outdoor-minded people, many of whom are already among the readers of Nature Magazine. The second object is to try to discover whether our Association and magazine may be of service in supplying the meeting place now lacking. What we want to discover is whether there is a sufficiently large and general interest to warrant the inauguration of a properly-conducted Hiking Department in the pages of Nature Magazine. The department we have in mind would serve as a forum for the exchange of information, advice and news of hikers and hiking in the United States. The only way in which we can discover this is through expression by our readers. The extent and character of this expression will determine our future course.

HIKING, A NATIONAL PASTIME

BY ERNEST A. DENCH

WE need not hark back beyond the period middle-aged ramblers vividly remember—the trolley ride to the city's outskirts, where the woods and pastures offered delightful walks. Suburban streets and houses now replace most of these rustic retreats. Those dirt roads, once plentiful in the countryside adjacent to the outer suburbs, are today disciples of that famous Scottish roadbuilder, MacAdam. There that parasite, the hitch-hiker, reigns. He and the bona-fide hiker have nothing in common.

He who seeks wild beauty spots, solitude and tranquillity on foot endured temporary defeats due to real estate and highway developments. As the hikes in nearby country decreased, more and more hikers converged in the same localities. The result was a mild form of congestion. So the more venturesome hikers decided to ride twenty miles instead of the former five or ten miles to where their quiet walks began. It worked perfectly for a while. Eventually the automobile octopus embraced these charming, winding country lanes.

It took more than these developments to defeat the determined hiker. What of the wild country—second-growth forests, hills, bluffs, dunes, swamps and abandoned farmlands reclaimed by Nature? He could catch glimpses of them during quiet lulls in traffic on the trunk highways. What lay in these, to him, uncharted tracts, extending, perhaps, for miles between the main roads?

Some entered the wilderness trusting to luck and a keen sense of direction. The more cautious fellows invested in topographic survey maps and a compass. Old logging trails were found in an excellent state of preservation, but

they always seemed to circuit the high places rather than actually to go over them; others came to dead ends. The weaklings turned back, while their stronger brethren, dormant exploring instinct coming to life, plunged through the underbrush. These budding explorers satisfied themselves what was above the rocky shelf, or beyond the next hill. Often they came upon narrow but overgrown trails, obscure in places, and, in many cases, originally blazed by the Indians to avoid heavy snows in winter and swollen valleys in the spring. Discoveries were often accompanied by real exploratory experiences—the problem of finding a reasonably dry route across a marsh, the encounter with a seemingly endless briar patch, wondering whether they would ever see daylight again in a dense young woodland choked with tangly underbrush.

In time, the hiker became conscious of the adventures he had missed during the long years of country lane cautiousness. One of these early explorers of twenty-five years ago was William Thompson Howell, whose recently published diaries disclose his scorn for road walkers. "I knew," he wrote, "that they were going to stick to the mountain roads, or at the most, climb Storm King, going back at night to tell of the wild country they had encountered, yet all the while oblivious of that real wilderness on either side of their route."

These wilderness-hike pioneers generally shared their discoveries with a few congenial friends. As the narrow circle appreciative of the more strenuous trips widened, someone suggested they form a club—and the trick was done.

The oldest existing hiking or rambling club in America is, as far as we can ascertain, the Fresh Air club of New York City. It commenced in 1877 as an offshoot of several athletic clubs, and the restricted membership, then as now, is composed of professional and business men. The club specializes in moderately strenuous cross-country walks. One of this hardy band was Mr. Howell, who thoroughly explored the rugged Hudson highlands in days when most hikers kept to the roads.

LUXURY ALONG THE TRAIL

Below, a pair of intrepid hikers check on their map to be sure that they are on the right trail

No other hiking or rambling club came into existence until 1904, when the Paterson Rambling Club of Paterson, N. J., was born. This club still survives. The Paterson Ramblers took their first outings to the then undeveloped suburbs in ordinary street clothing. Sometimes, by invitation, they visited a beautiful estate along their line of march. The gladness of the occasion was expressed in song—and let us hope the hostess was a music lover! Joseph Rydings, the club scribe of 1905, records a springtime visit to an apple orchard: ". . . . Gathered around our hostess, we united in singing the 'Ode of Welcome' to the tune of the Austrian hymn by Haydn. Mrs. Hall joined in singing the song." Twenty years later the club had advanced to the more vigorous hikes' stage, there being few remaining local places for good tramps.

Other organized activities took place during the 27 years separating the births of these two pioneer hiking clubs. The mountaineering clubs were adding virgin peaks to their accomplishments. It is hard to know where hiking ends and mountaineering begins. Today most mountaineering clubs also schedule trips no more arduous than those undertaken by hiking clubs. Perhaps the broadest interpretation is that a mountaineering club specializes in the use of the rope where cliffs and ledges are of the almost perpendicular variety, and the employment of crampons and ice axe in Alpine workouts. The hiking club, on the other hand, undertakes climbing or bushwhacking with one's feet and hands. Naturally, mountaineering is an advanced form of hiking, calling for the utmost skill and endurance on the part of climbers.

Significant of the national trend is that the oldest and biggest mountaineering clubs have always been located on our coasts. The pioneer is the Appalachian Mountain Club, whose natural terrain is New England. Formed in 1876, it now has about 4000 members. Second in the field is the Sierra Club of California, dating back to 1892, and having nearly 3000 members.

But hiking thrives in flat inland country. While a range of hills is an asset, it is not a necessity. The fundamental need is the kind of terrain affording a day's escape from civilization, such as forest preserves, river and brook footpaths, outskirts of open fields, marshlands, rugged bluffs and steep dunes.

From a hill climbing standpoint, one of the unpromising cities in which to establish a hiking club is Chicago. Yet here, in 1908, the Prairie Club first saw the light of day, and has flourished all these years. Today it is the largest organized hiking group in this country, with a 1934 membership of 838. Another large organization, but of recent origin, is the Minneapolis Municipal Hiking Club, better known as "The Minnehikers." Among other inland cities where organized hiking flourishes are Cincinnati, Cleveland, Omaha, Hastings (Nebraska), Milwaukee and Indianapolis.

THE HARDY HIKER GOES TO THE TOP
Those with the instinct of the explorer are not content with just following the easy trail

Prior to 1924, when the Smoky Mountains Hiking Club of Knoxville, Tennessee came upon the scene, there was little activity in the South. The Southern Appalachians, then an unbroken, untamed wilderness, had been entered by relatively few trampers. A few samples of the almost impregnable rhododendron jungles, locally known as "slicks," "hells" and "woollyheads," deterred most attempts to reach the interior. More than twenty peaks exceeding 5000 feet in height are in this area. What really aroused spirited interest in southern hiking was the Appalachian Trail project, coupled with the acquisition of nearly half a million acres to form the Great Smoky Mountains National Park. Now there is a flourishing chain of hiking clubs between the District of Columbia and Georgia.

From a national standpoint the numerous outdoor clubs charted a lonely course until 1915. Each club was concerned with its own regional interests. This enforced provincialism was occasionally broken when, for instance, an easterner made a western trip and visited one or more clubs there. He was accorded true hospitality, but these ambassadors had their limitations. At that time LeRoy Jeffers of the American Alpine Club realized the growing need for fraternal intercourse and merging of common interests. Under his energetic, uncompensated, full-time direction there grew the Associated Mountaineering Clubs of North America. Nine clubs came under its protecting wing the first year; eleven years later there were seventy-one affiliated organizations. Helpful bulletins were published. After Mr. Jeffers' death in 1927, the executive work was taken over by Raymond H. Torrey, the eastern hiking authority, and continued until 1931 under the new name of the Associated Outdoor Clubs of America. *The Mountain Magazine* was the A.O.C. official organ—and when that publication was discontinued in 1931, the A.O.C. also perished.

Meanwhile another phase of hiking activity was coming to pass—the desire for passable trails in the untracked hinterlands. Club executives were convinced that certain routes embodying the best scenic features of the terrain would bring them within the physical capacity of the hiking majority. Even with trails sparsely distributed through a wide region, the hardy minority of the hiking clan would still find plenty of scope for cross-country treks.

The first major trail undertaking in the East was the Long Trail of Vermont, started by the Green Mountain Club in 1910. It now runs from the Massachusetts border to the Canadian line, a distance of some three hundred miles. The Long Trail inspired a number of local trail systems in various parts of the country, particularly on both coasts.

Many a man has secretly nursed an idea for years, too modest or too occupied in other directions to give it birth. One such is Benton MacKaye, who, a few years prior to 1910, visualized a continuous mountain footpath along the Atlantic seaboard. The plan was delivered to the out-

SIESTA ON THE SIDE OF THE MOUNTAIN
That healthy fatigue which comes from a goal hardly won, that companionship of Nature, is the reward of the hiker

side world in 1921. The first years were occupied surveying the complete route and procuring enthusiastic volunteers in key locations. The Appalachian Trail, later nicknamed the A-T, did not gain appreciable momentum until 1927. In the following years hiking clubs sprang up by the dozens along this 2050 mile Maine to Georgia wilderness route. The A-T is now finished except for a difficult eighty miles in Maine.

Until the advent of the A-T, hikers were principally big city people, seeking solace from civilization on their leisure days. Their imaginations were fired by the immensity of this volunteer trail undertaking. This, in turn, spread to both small town and country folk, without whose energetic aid important links of the A-T in regions far removed from the populous centers would still be uncompleted.

Important branches, or major trails subordinate to the A-T, are only the matter of a few years. Work has already started on one of these. This one will leave the A-T forty-two miles from New York City and end at Lake Placid in the Adirondacks, a walking distance of nearly three hundred miles. Should this inland penetration continue, the Middle-west clubs will have an incentive to engage in trail construction and maintenance.

Westward ho will be the last step in girdling the country with an interwoven system of hiking trails. This may occur sooner than we realize because the projected Pacific Trail, 2500 miles over the mountain ranges from the British Columbia to the Mexican borders, is well in hand. Existing National Park trails, coupled with CCC activities, are accelerating the long, through route. When that is done, ambitious westerners will not wish to cry a halt. The probability is that one or more forks will project eastward, using courses favored in covered wagon days and old Indian trails for the prairie co-ordination.

The heavy inroads of civilization—cities, highways and farms—will not prove insurmountable obstacles, as witness the A-T, much of which is over private lands. The seasoned hiker learns to be philosophical if the footpath is much longer than the highway, the grades more difficult, or the terrain swampy or choked with lush summer growth. Give him such conditions and he has the true feel of the wilderness, the perfect communion with Nature and the zest of adventure.

On the heels of these developments may come lean-to or cabin facilities for overnight shelter every ten miles. Perhaps, too, another and a more lasting national association of outdoor clubs will arise from the ashes. At present the two main organizations, one east, the other west, are the Appalachian Trail Conference and the Western Federation of Outdoor Clubs. If these would merge, we would have a national body, as they would take in the inland clubs. At present the latter are without any affiliations whatsoever, a condition which needs rectifying.

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E. Chesley Allen will be again in the pages of Nature Magazine in the July issue with a delightful Nature essay on the gentle art of keeping still. Charles Fitzhugh Talman gives us a story of the hows and whys of summer just as he did of spring. This year is "National Park Year" and we will present a special pictorial feature of National Park views which will make you want to pack your bag and be off for the great open spaces. Or, if you must stay home, Paul Kearney's article and splendid pictures of the shells of our eastern beaches (a companion article to that of last year on California beach shells) will make your seashore trip interesting. There are other features but this note fills up the space available and you'll just have to wait for the July issue

A ROCKERY EFFECTIVELY COMBINED WITH A GARDEN POOL

One of the "don'ts" to remember in planning and placing a rock garden is that it should not be placed in some spot shaded by a tree or a building but be given enough sun

CONTINUOUS BLOOM IN THE ROCKERY

SOME ADVICE ON SELECTING YOUR ROCK GARDEN PLANTS

BY JOHN H. BAIN

No recent innovation has brought more charm into our gardens than the rockery. Not that it is new in horticulture, because it has been in vogue for many years in the leading gardens of Europe as well as America, but not until recent years has it gained such favor in our garden circles. The rockery has several striking points of advantage that commend its introduction. Its novelty as well as its beauty, its condensed form, the ease of culture and the panoramic change from day to day, all combine to throw about the rockery a peculiar fascination that lures us daily to its side.

While we are here primarily concerned with the flowers in the rockery, however proper the selection of the planting, the whole enterprise may easily go awry if some trifling blunder be made in either location or construction. So, perhaps, a few "don'ts" that seem so vital to our success may be in order.

Do not build the rockery too small. You will readily discover your mistake before you find space for your own selections and the generous offerings of your neighbors.

Do not simply make a pile or pyramid of rocks, or throw up a mass of earth with a few rocks scattered promiscuously about. Remember we are planning a rock garden with the emphasis upon "garden." The construction should proceed together, forming a mound rather than a pyramid, permitting one-third to one-half of the rock to protrude from the surface of the earth.

Do not aim at too much precision or symmetry. The set-up as a whole should conform to some general design or plan, but the detail should be casual and irregular. Do not fit the rocks too closely together, or fill in the intervening spaces with smaller rocks. This space belongs to the plants.

Again, let us not thwart the whole interesting venture by thrusting the rockery back in some shady recess or under the shadow of some building or tree. It belongs in the sunlight. I know there are very many regular as well as alpine plants, that prefer shade. But we should not hazard our fond project in order to accommodate certain shade-loving plants when there are hundreds of sun-loving plants—far more than we can possibly use—clamoring for admission into this little beauty spot. Give the other plants their desired location in some shady, cozy corner.

Lastly, do not make a riotous bramble of the rockery. It will be shabby enough, with all your pains, without admitting some ill-behaved plants that seem to revel in confusion. We are not landscaping but rather gathering

FEW ARE ABLE TO GIVE A ROCKERY SUCH A SETTING AS THIS
Even though the gardener's space for a rock garden may be small, he may achieve as much on a smaller scale and the results will be fully as much delight to him

together a family of élite dwarfs to form a coveted spot in our yard. Besides, uncouth folk should keep their own company as only the tidy and well-behaved mingle well in the family apartment. I have before me a catalog offering "rockery plants." It describes therein some attaining a height of "three to four feet." These may find a place in landscaping some wide estate or in naturalizing some waste area, but certainly have no place in the rockery I have in mind. I would not admit a single plant with much greater height than the rocks with which it mingles, excepting a few of the more sprightly, graceful sorts, as coral bells, dianthus, campanulas and columbines.

Now, presuming that all the "don'ts" have been observed what shall we select for a succession of bloom in our proposed rockery? The first thought suggests a wide range of varieties as well as blooming season. And yet these characteristics are the elements of charm. I would rather have a soft tuft of the delicate pink aubrietia, nestling snugly in a bed of green sedum, than to have two plants of either, and likewise have one variety of sedum blooming in May and another in July, than two at the same time. So we must regard not only the matter of variety but also the blooming season of the plants. Spring is far more gracious in her supply of bloom than summer. In fact we must be much more careful and less fastidious in our selection for summer, when conditions of heat and moisture greatly affect growth. Fortunately there is a fair range of plants thriving well under summer conditions whose foliage is equally interesting and that will sustain charm for this season.

We must bear in mind the matter of habit of growth in making our selection. If your rockery is to prove a real blessing as well as a delight, order and system will contribute largely to this end. With respect to habit of growth, rather than genera, the plants we shall be obliged to select fall casually into about six general classes: carpet or matting; tufted; clump or bushing; branching; grassy, and the fleshy, waxy sort such as Sempervivum.

Usually the larger rocks are placed more remote from the paths, and likewise our larger plants are found there also. Most of the sedums and other carpeting and matting plants belong in the foreground. Generally speaking there is such a difference in the height of plants in the same variety that we must be careful to select the more dwarf specimens. As an illustration, there are some specimens in each of the two great families of campanulas and veronicas that grow to a height of three to five feet. Then, too, there are dwarf specimens of these same families that reach but six to eight inches. So in all selections, be careful to choose these dwarf sorts in any group.

With only a little painstaking we can have a rockery as impatient for the return of spring as we ourselves. A liberal supply of the smaller spring-blooming bulbs like crocus, fritillaria, dwarf iris, muscari (grape-hyacinth), scillas, and some of the miniature daffodils tucked beneath and behind the rocks where they will not be disturbed, will vie with each other to drive the tardy snows away. From this point forward, scope of selection widens rapidly. In fact, the difficulty is to determine which few of the host of enticing, deserving flowers shall be honored with a place in our newly-appointed bed. Among the many harbingers of spring, blooming in April or May—according to our latitude—the author has many favorites. *Phlox subulata,* also called moss pink, is an early and certainly one of the best carpeting plants of all. Its almost solid blanket of soft rose pink coming so early, arrests the

ANOTHER SPOT WHERE CONTOUR AND PLAN DEMANDED A ROCKERY

Even the border of the pool is used for the planting of low-growing or mat type rock garden plants which lend color to the scene as the season progresses

attention of the most casual observer. Of the many good varieties, Lilacina Rosea, rose pink; Vivid—the best—a bright pink, and Alba—white—are splendid sorts.

Bellis perennis, or English daisy, comprising a large family of neat little plants, throws up stems of four inches, bearing double blooms in white and several shades of rose and pink. Snowball and Longfellow, pink, are two good varieties. *Primula,* or primrose, is another early favorite in many shades of yellow, purple and red. Stems of four to ten inches rise from a cluster of serrated leaves during early spring and summer. The bold mat-forming *Arabis* or rockcress, eight inches in height, should occupy some rugged spot in the rockery. Alpina, white, and Alpina Rosea, red, are two splendid varieties. Then we must not forget our beloved Myosotis—forget-me-not—with its array of tiny light blue and pink flowers that linger for weeks in the spring. They will thank you for a location on the shady side of some rock and a little cover in winter. Be sure and include the charming new pink in your list. By diligent and successful effort, the viola or tufted pansy has won a choice place in our gardens. Its almost continuous array of colorful bloom and its neat, chaste habit of growth make it most popular. If kept from seeding, some varieties will bloom through the entire season. Gracilis, purple, starry flowers; Sutton's Hybrids in apricot and pinkish tints, and the persistent Jersey Gem, a rich violet, are very fine sorts. Of the larger clump-forming plants, hardy *Alyssum* or golden tuft lifts its mass of yellow bloom well above its vying neighbors for several weeks. The leading varieties, all in shades of yellow, are *A. saxatile compactum,* early spring; *serpyllifolium,* later, and *argenteum* for summer bloom. Another bold bloomer of early summer is *Iberis,* hardy candy tuft, with deep green foliage, profusely covered with shining racemes of pure white. *Sempervirens* and Little Gem are good varieties.

Another large genus of garden flowers—*Dianthus* "Pinks"—afford many dwarf varieties suitable for the rockery. These come mostly in tints of red. *D. deltoides,* the best, a low matting sort, gives tiny pinks in May. *D. caesius, neglectus* and *alpinus allwoodi* are also fine. There are several dwarf varieties of the well known *Veronica. V. rupestris* and *repens* bloom in May and June, and *icana,* a taller sort, in July and August. The especially charming *Aubrietia,* with its mantle of rose-lilac spreading over and between the rocks in early spring, is likely my choice of all the carpeting varieties. *A. eyrei* is the best sort. Another quite popular family of creepers is *Thymus* or thyme. Its aromatic foliage, covered in early summer with myriads of tiny blooms in shades of yellow, pink, crimson and white, forms a solid mat of deep green. Three other favorite matting plants are *Gypsophila,* white and rose; *Calamintha,* purple, and *Saxifraga,* yellow. My choice of the truly creeping or running dwarfs is *Linaria* or Kenilworth-ivy. A profusion of tiny lavender flowers amidst serrated leaves are in bloom almost continuously throughout the entire season. I must mention the dwarf campanulas, blue; *Helianthemum,* evergreen, white, yellow and scarlet, and the real favorite *Heuchera,* coral bell, draping its graceful stems in myriads of tiny crimson bells in June, July and August. The crimson sort is far the best.

You may have been wondering whether we are to omit the great family of sedums. I assure you we will not omit or even slight them. These interesting plants comprise several hundreds in cultivation and are most admirably adapted to the rockery. Their shiny waxy foliage has creeping, matting habits, and the riot of color runs the

whole gamut of the spectrum. Some sedums bear scanty bloom, but whose lovely verdure is a sufficient compensation for this seeming delinquency. In fact its most important service is to maintain a constant sheen of glistening green and colorful bloom through the sear weeks of summer when many other flowers fail us. We must mention a few of the many choice varieties of this great family. *S. sarmentosum,* perhaps the best vining sort for spreading between and over the rocks, has abundant yellow, starlike blooms on soft yellowish-green foliage in July. *S. stoloniferum,* with evergreen leaves, bears a profusion of purplish bloom in July and August. *S. kamtschaticum* is a vigorous dwarf with golden bloom in July. *S. spurium coccineum* is covered with a mantle of rosy crimson bloom in July and August. *S. glaucum,* with meager bloom but with attractive soft, green foliage, is one of the best for carpeting. *S. album* with spreading, thick leaves has little bloom in July. *S. acre* and *sexangulare,* two dwarf varieties much alike in habit and color, bloom in May and June. The taller sorts of *Sedum* are not suited to the rockery of modest proportion, but are beautiful in the border. Then, lastly, enter *S. sempervivum,* that familiar family of "hen-and-chickens." How could we get along without this sturdy family of little rosettes to fill all the rocky niches and chinks that are too small for the larger plants? Their modest demand for room, their splendid behavior and extreme hardiness speak eloquently for a place in the wee corners of our gardens. We should use only the hardy sorts of which there are many varieties.

A ROCKERY IN A SMALL SPOT
Here the gardener, with only a tiny place to work, has combined both rock garden and pool

Just a word about annuals. I like to secure a package each of the following annuals in the very dwarfest varieties, mix them and scatter the seed over the rockery and along the walks about the first of May: California poppy, alyssum, ageratum, candytuft, lobelia and portulaca. They will greatly add to the charm in midsummer. This is a most admirable treatment for the older rockeries.

A few extra hours of care and study in planning the rockery, will richly repay us in weeks and months of enjoyment of this most entrancing kind of garden.

●

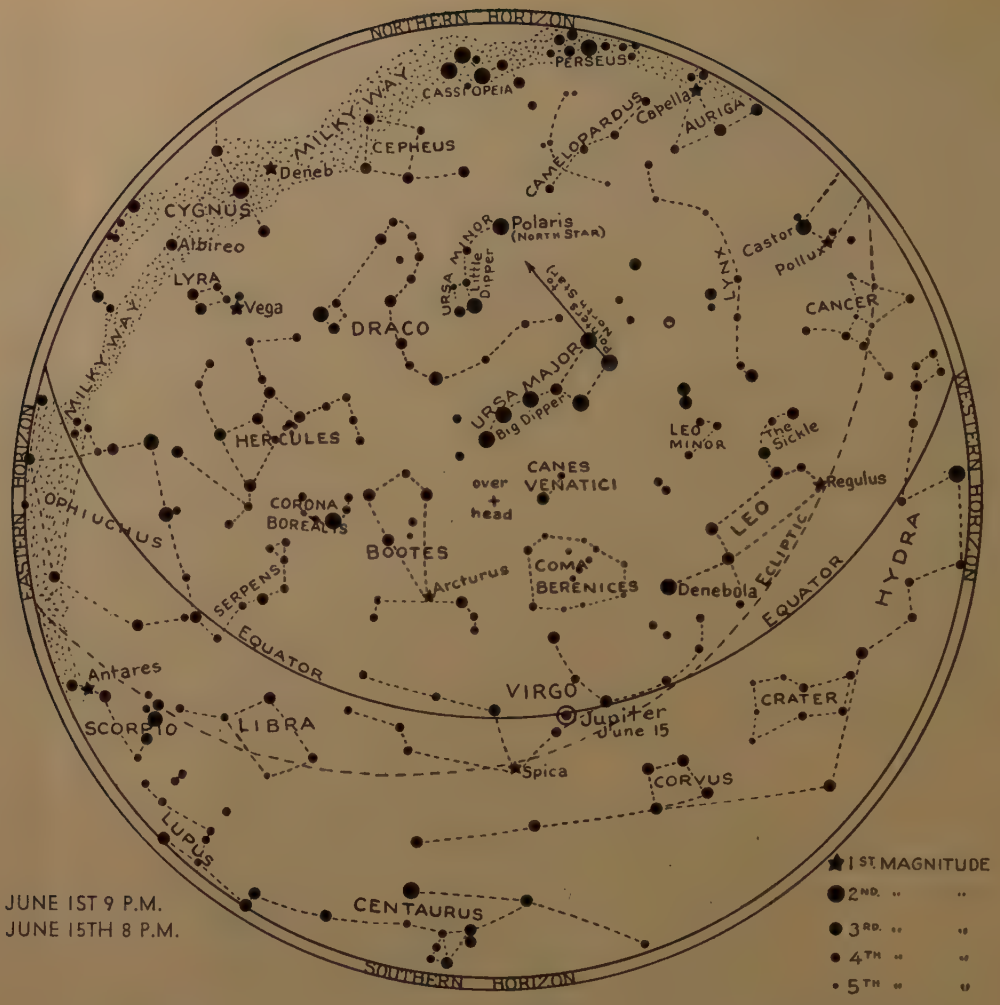
AN ORPHAN

BY MARCIA M. EAGEN

SOME hunter failed to look for antlers and it was an orphaned fawn that Charles E. Hazen of Long Lake Lodge, Wisconsin, found wandering and hungry in his maple grove. Immediately she joined the family circle, was christened "Betty" and successfully raised on a bottle. Christmas came and a fir tree was specially decorated with candy for Betty. She had a highly developed sweet tooth.

For the two years that this orphaned deer lived with the Hazens her devotion to Mrs. Hazen knew no bounds. She came immediately at her call and followed her about everywhere like a faithful dog.

Finally, however, there came a call. It was insistent and overpowering and Betty left to answer it. It was the call of the wild and she disappeared without ceremony into her native woods, never to return, completely cutting the ties that bound her to humans. The Hazens hope that she, too, did not fall at the crack of a thoughtless hunter's gun and leave another orphaned fawn to starve. And they cherish the memory of the two years that she lived with them and gave faith and devotion.



To use this map hold it before you in a vertical position and turn it until the direction of the compass that you wish to face is at the bottom. Then below the center of the map, which is the point overhead, will be seen the constellations visible in that part of the heavens. It will not be necessary to turn the map if the direction faced is south

A NEW SUN-SPOT CYCLE BEGINS

BY ISABEL M. LEWIS

SUN-SPOTS, as has long been known, appear in cycles with irregular periods that range anywhere from seven to seventeen years but average about eleven years. It is also one of the most characteristic features of sun-spots that they appear in zones on either side of the solar equator. No sun-spots are ever seen within five degrees of the equator and they rarely appear more than thirty-five or forty degrees from the equator. Another peculiarity is the fact that spots of a new cycle appear first in high solar latitudes, about thirty degrees north and south of the equator, generally about two months or so before the sun-spot minimum, and gradually work down toward the equator as they increase in number. At the time of a sun-spot maximum hundreds of spots may be visible on the solar surface at the same time and they will then appear in greatest numbers about sixteen degrees north and south of the equator. As the number of spots decreases after the maximum has passed they will continue to draw nearer to the equator and will gradually disappear at the end of the cycle in latitudes eight or ten degrees north or south.

Though spots of a new cycle usually appear several months before the time of sun-spot minimum, spots of the dying cycle may continue to appear in low solar latitudes for a year or two after the start of the new cycle. Two spots belonging to the new cycle appeared last fall. The first was seen on October 10 in latitude 26 north, a small spot lasting only a day. No other spot of the new cycle was seen until October 28, when a small group appeared thirty-two degrees south of the equator; at the same time a spot belonging to the old cycle was seen nine and one half degrees north of the equator. During the past year sun-spots have been extremely scarce. Days have passed without the appearance of a single spot on the surface of the sun. The scarcity of spots and the low solar latitudes in which they appeared

were indications that the sun-spot minimum was approaching. The two spots of the new cycle appearing late in the fall were additional proof that the old cycle was near its completion. The exact date to be determined after all the observations have been plotted will probably fall late in 1933, or early in 1934.

The last sun-spot minimum fell in the summer of 1923, and the one before that in the spring of 1913. As the rise to a sun-spot maximum is quicker than the fall from maximum to the next minimum, and averages about 4 and one half years, the sun-spot maximum of this cycle may be expected in 1938.

From now on more and more spots will appear in high latitudes working gradually downward toward the equator. There will be, at the same time, a gradual increase in all forms of solar activity. Sun-spots are an outward manifestation of deep-lying forces at work in the interior of the sun. Another most remarkable characteristic of sun-spots is that they all show magnetic polarities. It has been found that about sixty per cent of sun-spots come in bi-polar groups. Carried from east to west across the solar surface by the rotation of the sun on its axis in a twenty-five day period the preceding spot, or group of spots, will show the polarity, say, of a north magnetic pole while the following spot will show the polarity of a south magnetic pole. This will be true of all spots in the same hemisphere; all preceding spots of bi-polar groups will have the same magnetic polarity and all following spots the opposite polarity. In the other hemisphere, moreover, there is a reversal of polarity. Preceding spots in the northern hemisphere will have a polarity opposite to that of preceding spots in the southern hemisphere and following spots a polarity opposite to that of following spots in the other hemisphere. Again, spots in a new cycle show a reversal of polarity. If all preceding spots in the northern hemisphere of the sun showed the polarity of a *north* magnetic pole in the old cycle preceding, spots of the new cycle appearing in the same hemisphere will show the characteristics of a *south* magnetic pole. Spots of a new cycle can therefore be distinguished from spots of the old cycle in the same hemisphere both by their high latitude and their reversed polarity. The cause of all this is still unknown, but it is believed to be in some way connected with the rotation of the sun and the manner in which the circulation of gases is maintained in its interior.

Sun-spots are known to have a vortical motion similar to that of waterspouts at sea, and they spread outward from the top of the inverted funnel-shaped whirl in a similar way to form what is called the penumbra of the spot. The central dark portion called the umbra is the whirling vortex, and it carries electric currents that produce the strong magnetic fields that surround sun-spots and that have in many instances been known to affect the earth's magnetic field and set up magnetic storms, auroral displays and disturbances of a similar nature in the earth's atmosphere. The average umbra of a sun-spot is so large that the earth could be dropped into it without touching the sides. Even umbrae of minute spots are 500 miles in diameter and the largest spots have umbrae 40,000 to 50,000 miles in diameter. Including the much more extensive penumbra the largest spots, which are easily visible to the naked eye, have diameters of 100,000 to 150,000 miles. The life of a spot is generally only a few days, but spots have been known to persist for weeks or even months and sometimes a new spot will break forth in almost the same place where an earlier spot or group has disappeared, showing the deep-lying nature of the disturbance. Spots are dark because they are about 2500 degrees cooler than their surroundings. The expansion of the gases in the umbra of the spot produces a rapid cooling which lowers the temperature of sun-spot regions to about 3500 degrees Centigrade. Remove the more brilliant solar surroundings and the umbra of the sun-spot would be seen to be shining more brightly than any terrestrial source of light.

Many solar as well as terrestrial changes take place with the sun-spot cycle. As the number of sun-spots increase from minimum to maximum, solar eruptions known as prominences increase in number and intensity; there are more faculae, as the intensely brilliant flecks on the sun's photosphere are called; the form of the solar corona changes; there are more magnetic storms on earth, more radio disturbances; more auroral displays; more ultra violet radiations from the sun; and also, it is believed, there are certain meteorological effects produced upon the earth. It seems well established that at a sun-spot maximum the average surface air temperature of the earth is lower than it is at the sun-spot minimum and there are other changes suspected but not well established as yet.

On June 21 at 9:48 P.M., Eastern Standard Time, the sun reaches the summer solstice in the sign of Cancer and the constellation of Gemini and summer then begins. The sun is then farthest north and this is, therefore, the longest day of the year in the northern hemisphere.

Mercury reaches its greatest eastern elongation on June 14 and should be visible in the evening twilight low in the west for a week or so before and after this date. On June 14 it will be in conjunction with the crescent moon which should be helpful in finding it, only the time of conjunction is about 2 A.M., Eastern Time, and on the preceding evening the moon would be to the west of the planet. It should be found not far from the moon, however, on the evening of June 13.

Venus is still a fine Morning Star but Mars, though in the morning sky, is too close to the sun for observation. Jupiter will be found just east of the meridian at sunset. It will be in Virgo throughout the month a few degrees northwest of Spica, which is the beautiful, first magnitude star in Virgo, bluish-white in color. Jupiter's four brightest moons can be seen with a good pair of binoculars and its belt with a two-inch telescope. It is by far the largest and most massive planet in the solar system.

Saturn rises in Aquarius shortly after midnight on June 15. Its rings are visible in the smallest telescopes, though one needs at least a three-inch telescope to see them to advantage. Such equipment is not too expensive and to the star gazer is well worth the money invested.

• • •

THE SEA ROBIN

BY NELSON GROFE

"OH, DADDY, he croaked like a bull-frog," exclaimed the children all together, as they picked up a sea robin left by one of the many fishermen on the beach. He had, indeed, made a sort of grunt not unlike that of a frog.

"Yes," I said, "that's where he gets his name. He is called a gurnard, which comes from a French word meaning *to grunt*. Gurnards are found all along the coast, never very far out, and they steal the bait meant for the bass and the beautiful bluefish. They bother the fishermen, who throw them away."

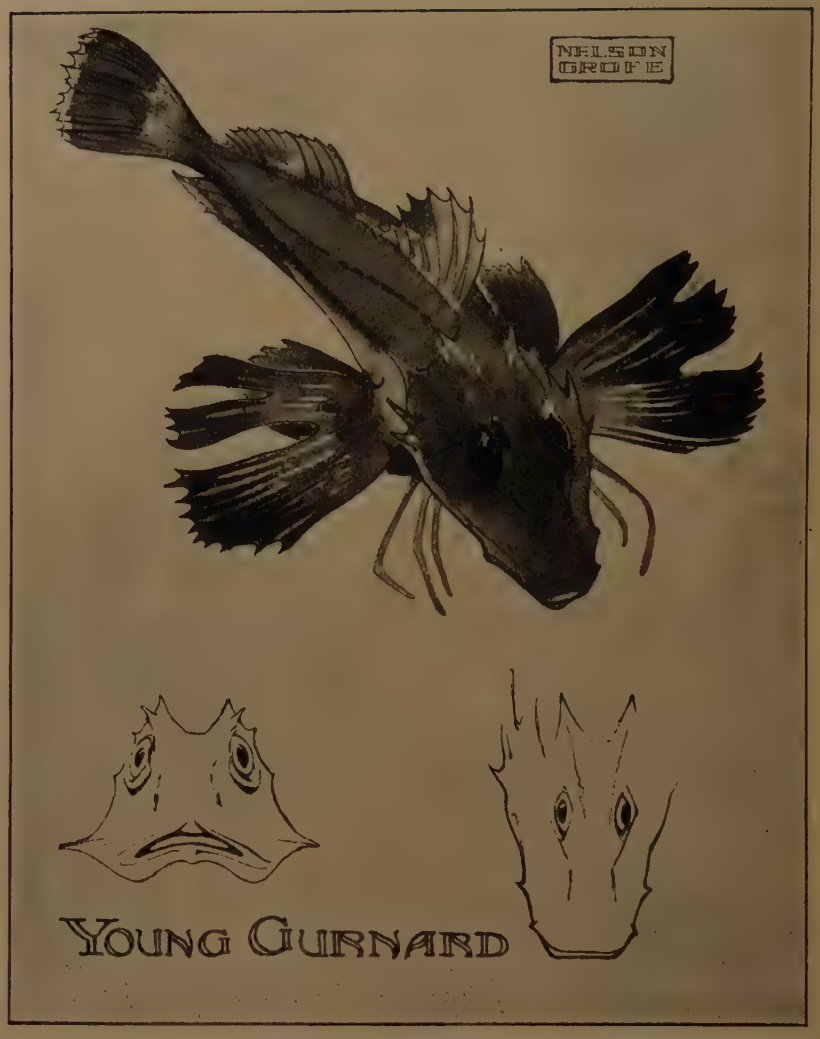
"Look at his big red wings! Isn't he beautiful? May we take him home?"

"Ask the fisherman" I said. They promptly did. Yes, they might take him.

"Can't you eat them?" Jerry wanted to know. He wondered that the man was so willing to part with such a prize.

"No, you can't eat them." All the fishermen who were asked the same question gave the same answer. At the fishing stations, where the gurnards are caught in great numbers, they are all thrown out of the boats for the gulls. Even the gulls seem not to like them. We have since looked up the matter and have found that, although little used in the United States, the sea robin is thought to be a good food fish in the Old World. When we have a chance we are going to try it ourselves.

Picking the wriggling fish up by his fan-like tail, we took him home and put him in a large pan of sea water. He welcomed this with much splashing, which washed most of the sand from his sticky body. Then we saw the full splendor of his coloring. His strange color scheme was a general stony gray-brown touched with a rosy glow above, and a dead white with orange and brown spots below. This became a strong orange color in the tail and the under fin. The climax came in his brilliant vermilion and velvety black "wings." His dark eyes glowed like opals in a gold setting. There is, however, a difference in the coloring among the sea robins, some being much more colorful than others. Gurnards live on the bottom of the ocean. Some live several hundred fathoms down. Those that are brought up from the greater depths are red.



LOOK ON THE COVER OF THIS NUMBER OF NATURE MAGAZINE TO GET THE TRUE PICTURE OF THE COLORS OF THIS FISH.

"Look at his fingers. He's walking on his fingers!" Joan was excited. Her own long fingers moved in imitation of the fish.

"Yes," I explained. "He not only uses them to crawl on the bottom of the sea, but also as feelers to find the small animals on which he feeds. They are the first three rays of his big fins that have become detached through past ages and grown longer into fingers. It is one of the things about the gurnards that makes them different from the other fishes. Another is his armor-like head. Have you noticed how the head is covered with hard bony plates? These are found on the members of the family of 'mailed cheeks' (Triglidae) to which the gurnards belong. See how the plates are marked with lines like some frost patterns and are rough like a file. So, besides beauty of coloring, the gurnards have beauty of form as well. Do you remember the skulls we found in the sand—snow-white skulls, from which every bit of color was gone? Were they not as beautiful as frost, or lace, and marvels of strength, too?"

Several days later we, too, were fishing, not in the ocean, but in the bay. Jerry was happy over catching a baby sea robin. The little fellow was between three and four inches long, olive in color, with long, all black wings. There was, as yet, none of the gay color that was to be his later. His head was shaped like the older fish and was hard and spiky, but it did not show the fine markings of the older fish. Sometimes the young fishes are beautifully colored and may be seen floating on the surface of the water, fins extended like butterflies. Indeed, to me these pretty fishes suggest butterflies or birds with bright feathers than scaly fish of the sea. The name of sea robin seems to fit them.

THE KIND FOSTER MOTHER

BY MADGE HAINES MORRILL

ONCE there lived in California a mother deer and two baby fawns. The little fawns were happy as they ran and frisked through the manzanita bushes.

But one day a hunter killed their mother. Then they became very lonesome, and hungry too.

By and by the little fawns wandered to a mountain-side where there was a fenced pasture. In the pasture was a flock of goats, browsing away like goats do.

At first the goats paid no attention to the little orphans. But after a while a mother goat, with a lonely heart, walked toward them. Just the day before some men had come and taken this mother's baby away. She was very lonesome now, just as the motherless babies were.

So when she saw the fawns, she seemed to understand what had happened. In goat language she told the little babies that she would be their mother.

The fawns quickly ran under the fence and kissed their new mama. They were happy again.

Several weeks later men came to take the herd of goats to another pasture. Then they found the mother and her adopted babies.

A kind neighbor took charge of the young deer for several months, and later they were given to a city park.

Don't you think those two deer are still thankful they were adopted by a kind mother goat?

UPSIDE DOWN BIRDS

BY R. BRUCE HORSFALL

THE friendly little chickadees are known to most boys and girls as the upside-down birds, because they, and their distant cousins the nuthatches, are equally as comfortable hanging with their heads down as they are right side up. But not many boys and girls have seen the kind of chickadees shown in the picture on the next page. They are mountain chickadees, birds of the high western mountains where they live among the pines, firs and spruces.

Mountain chickadees are just as friendly as their eastern cousins, the black-capped chickadees. They

greet you cheerily when you climb the high steep mountains where they live with their families. They are found living as high up as trees can grow and that's pretty high, almost two miles in some places.

In the winter time chickadee families go south as far as southern California and Texas where it is not very cold.

But in the early summer they return, and what jolly times they have flying about from one clump of trees to another, away up in the mountains where some snow fields are still sparkling in the sunshine.

Chickadees always build their nests in holes in trees. Sometimes they may have as many as nine babies to take care of all at one time.

Should you ever go to the mountain home of these little birds you will know them at once. They will find you out and come so close that you will be able to see the white line over the eye. Then you will know that they are not black-capped chickadees because the black cap on the black-capped chickadee comes down to the eyes.

●

THE FIRST MUSIC LESSON

BY FLORENCE H. MOORE

"While Mother gets your breakfast,
I'll teach you how to sing,"
Said Father Robin, to the twins,
"All ready, let's begin."

The babies opened wide their mouths,
But not a sound came out;
You see, they didn't really know,
What it was all about.

"Cheer up—cheer up—cheer up,"
Sang Father Robin, loud and long;
"Cheer up—cheer up—cheer up;
Some day you too will sing this song."

Then Mother Robin came on time,
And fed each open, yellow beak;
"Che—*ee*," the babies faintly chirped,
And went right off to sleep.

Find the Mother Robin.

Susie Has It Soft

Susie lives in the Cincinnati Zoo, the pampered darling of the Zoological Society of Cincinnati. She came to this country on the first trip of the Graf Zeppelin, a full passenger fare being paid for her transportation. She is now seven years old and weighs 160 pounds. She has her own electric refrigerator, her own sleeping quarters, a sun parlor and a winter home. She has her own private tutor, eats her meals with knife, fork and spoon, drinks from tumblers and cups and has her meals cooked by her own special chef. When she is ailing she has a physician attend her. Susie is a gorilla and Susie has it soft.

New Forest Areas

Some 6,127,000 acres of land have been added to our National Forest resources through recent purchases approved by the National Forest Reservation Commission. This establishes thirteen new National Forest purchase units and enlarges thirteen existing units in ten of the states east of the Great Plains.

Virginia Ornithologists

A resolution opposing the baiting of wild fowl within one hundred yards "of any blind, battery or other device from which these birds may be taken legally," was adopted at the recent meeting of the Virginia Society of Ornithology held at Alexandria. In a two-day session the members were addressed by several eminent leaders in the bird world. Ruskin S. Freer of Lynchburg College, Lynchburg, was re-elected president, and Dr. Florence Hague of Sweet Briar College, Sweet Briar, continues as secretary. Dr. J. J. Murray will continue to edit *The Raven,* monthly bulletin of the Society.

"Bunky" Saves a Mouse

Billy Fries of San Francisco has a dog named "Bunky." He is pretty proud of him because one day one of Billy's mice got out of its cage and started across the yard. The two ducks in the yard thought the mouse's tail was a worm and made a grab for it. Then "Bunky" came to the rescue. He shoved the mouse in the corner with his nose and prepared to defend it. For five minutes he lay between the ducks and the mouse, holding them off. "And that is how," writes Billy, "my dog saved my mouse."

A Mother's Care

By Myrtle Walkington

Once a day throughout the winter I placed feed in my backyard for some robins, jays, red-birds and the usual flock of sparrows. The season had been unusually mild and free of snow and the birds could eat from the ground. But March came roaring in on the wings of a real blizzard and I had to move their dining-room to my back porch. It was then that one certain sparrow attracted my notice. Should I be late with the feed it would cling to the screen door fluttering and chirping until I heeded its call. Warm spring days soon called the other birds to their nest building, but my sparrow stayed with me. One day I propped open the screen and waited. In she hopped followed by her brood of five noisy bob-tailed youngsters. Daily for a week they made free with my kitchen, then came no more.

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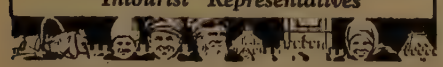

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—Sinclair Lewis

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THE DRAMA OF THE STURGEON

(Continued from page 284)

shaped fish, of the genus *Acipenser*, youngest of the Ganoids. It has a prolonged snout. The mouth is without teeth, it is under the head and it is provided with long suckerlike lips for the taking in of food from the bottom. It has four barbels or feelers, and the skin is rough, and the body armed with five rows of bony bucklers. These bony plates change with age, and in old fish (Von Baehr states that observations made in Russia indicated that the sturgeon may attain an age of two to three hundred years) are often lost or absorbed in the skin. There is a single dorsal fin, placed as is the anal fin, far back. The sturgeon is a bottom feeder, and an examination shows that he feeds on earthworms, crustaceans and vegetation. Much mud also is found in the intestines.

Goode and Gill claim that five distinct species exist in America,—two on the Atlantic Coast, one in the Great Lakes, Mississippi Valley, and northward, and two on the Pacific Coast, and the latest authorities confirm these findings.

Adult sturgeons range in length from two and a half to thirty feet long, and weigh up to three thousand pounds. A length of eighteen feet has been reported for New England in past years, but anything more than eight feet in American waters is now a rare catch.

The spawning season is June, and all species ascend rivers for this purpose. Claims have been made that a large female may contain as many as two to three million eggs, but the only actual count I have been able to learn of is Dr. Gunther's count of 635,200. The Lake sturgeon mentioned above, long known as *Acipenser rubicundus* but now called *A. fulvescens*, is found not only in the Great Lakes, but also in the Mississippi River and its tributaries and part of the Hudson Bay drainage. It is known as Lake sturgeon, Ohio sturgeon, red sturgeon and rock or stone sturgeon. It seldom, if ever, enters the ocean. It attains an average length of five to six feet, and weighs thirty to forty pounds.

Little wonder the sturgeon has become scarcer and scarcer, considering the value of the individual fish, the high price placed on its roe, the fact that the meat itself is valuable fresh or smoked, that the finest isinglass is made from the sturgeon's air bladder, and that the internal organs produce glue and the skin has been made into leather.

There is one final interesting point about caviar, since its high price has proved the chief factor in the near extermination of the sturgeon. In the 1908 report of Fisheries of the United States, the sturgeon report does not include caviar. The explanation given was that "the sturgeon caviar produce was, in many cases, reported in conjunction with paddlefish eggs". For this reason the sturgeon eggs could not be reported separately from those of the paddlefish, *Polyodon spathula*, known also as spoonbill, duckbill cat, and shovelfish, and found in all the larger streams of the Mississippi Valley. The combined production of roe, 79,000 pounds, was valued at $70,000. It is interesting that the 1930 report makes no distinction or explanation, but reports merely: sturgeon roe, fresh, 182 pounds; salted,

740 pounds; caviar canned, 8,024 standard cases; value $1,004,820. This seems to signify that other fish are now furnishing caviar, and will go the way of the sturgeon if not protected.

Well, you can have the caviar, gentlemen. I would much rather have little fish that will grow up from those eggs than to buy them in little cans. *The moral of this tale is:* If you do not let fish spawn in season, time will come when many of the species will be as rare, compared to what they were, as the sturgeon is today.

A Revised Edition

There is a dearth of good literature on reptiles and we welcome the appearance of a new and revised edition of *Reptiles and Amphibians* by Dr. Thomas Barbour of the Musuem of Comparative Zoology of Harvard University. Here is a fully illustrated, simply presented volume dealing with the habits and adaptations of this class. It is a most valuable book since it provides an essential background for the consideration of reptile and amphibian life and traces the evolutionary processes by which this life has achieved its present forms. There should be a large and warranted demand for this edition. It is published by Houghton Mifflin Company and sells for four dollars.

Smoky Mountains Hiking

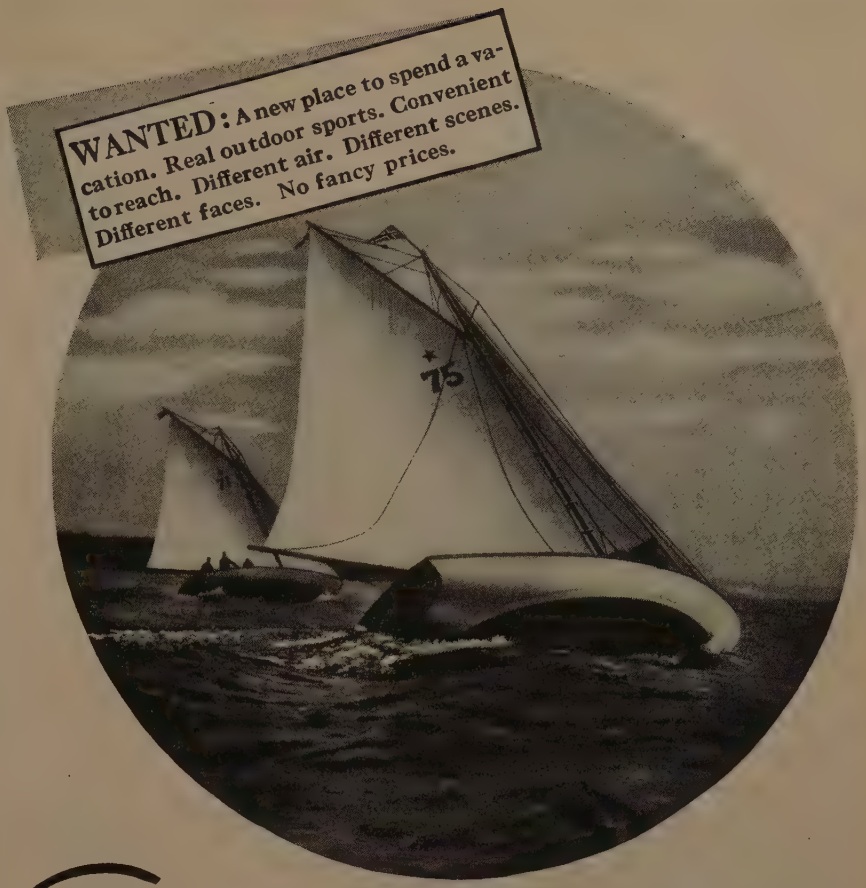
If you're going hiking this summer in the Smoky Mountains you will want a copy of the Handbook of the Smoky Mountains Hiking Club. This attractively printed little booklet sets forth the program of this active organization for the current year, contains information about the region and includes a map of the Great Smoky Mountains National Park. The booklet is available from the Smoky Mountains Hiking Club, P. O. Box 454, Knoxville, Tennessee, at fifty cents a copy.

Duck Malaria

Ducks have a disease like malaria, caused by a parasite. This has been the subject of researches by Earl C. O'Roke, assistant professor of forest zoology at the University of Michigan. His discoveries and conclusions are embodied in a bulletin entitled *A Malaria-Like Disease of Ducks*, published by the University of Michigan Press, Ann Arbor, Michigan, and available at twenty-five cents a copy.

Conservation Teaching

There is a splendid constructive idea in the two latest publications of the Emergency Conservation Committee. It takes the form of two leaflets in a conservation series of "Teaching Units." These are designed to be used for conservation teaching in the schools, and both of the units have been prepared by Ellsworth D. Lumley of the biology department of the Great Falls High School, Great Falls, Montana. The first unit bears the title, *The Shortage of Waterfowl*, and the second, *Hawks*. Here are two vital questions in bird conservation. The teaching plan is splendidly worked out, and we should like to see these and other similar conservation documents used and taught in every school in America. Copies of these units are available at ten cents each from the Emergency Conservation Committee, 734 Lexington Avenue, New York City.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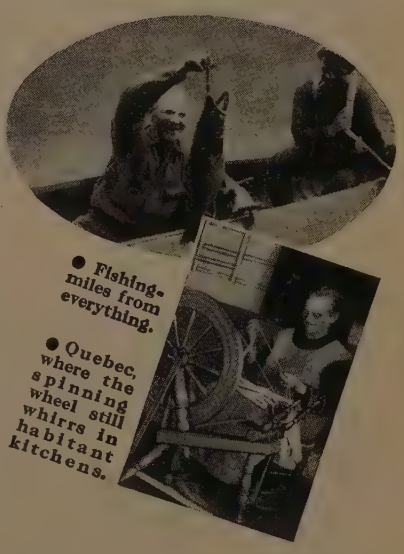

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MORE NAMES FROM LATIN AND GREEK

Again we present analyses of scientific names of two things described in this issue of Nature Magazine. The analyses are prepared by members of the Latin Junior Scientists' Club of the Abraham Lincoln High School in Brooklyn, New York. The research was done by members of the Club as well as those whose names are signed to the analyses. This month the subjects are the Ear-shaped Seaweed (Page 285) and the Lake Sturgeon (Page 283)

EAR-SHAPED SEAWEED—*Fucoides auriformis. Fucoides* (*eidos*, form) is a generic name applied to marks in the rocks supposed to represent seaweeds.

The Latin *Fucus*, coming originally from the Greek *phycos*, meant seaweeds, and the same word was used for the red or purple color of the dye the seaweed gave, and for the rouge the Roman ladies used. *Auriformis* explains the shape, for *Auris* means ear.

The order *Fucaceae* is a group of coarse olive-green or brown seaweeds. *Fucus*, a genus of *Fucaceae*, are known as rockweeds, because they are the principal vegetation of rocks exposed at low tide in northern regions. Various species of these are distinguished by their fronds and named for them. *Fucus serratus* (*serra*, saw) has fronds distinctly toothed; its near relation, *Fucus furcatus* (*furca*, pitchfork), has forked, branching fronds; and in *Fucus ceranoides* (from *ceras*, horn), the fronds are repeatedly branched, like the horns of a deer. *Fucus* is a name also given to a substance yielded by seaweed when it is burned, and from which iodine is obtained.

Other interesting words come from the same root. *Fucusol* is an oil produced from seaweeds; and *fucivorous* and *fuciphagous*, from the Latin *vorare*, to devour, and the Greek *phagein*, to eat, are used to describe animals that feed on seaweeds.

From *auris* we get the word *auriscope*, an instrument for examining or seeing inside the ear; and this is used by *aurists*, those who treat disorders of the ear; there are many other derivatives. In zoology, *auriculo-orbicularis* is a muscle connected with the lobe of a hedgehog's ear, and *Auriculidae* is a family of plant-eating gastropods, some of which are called ear-shells.

ETHEL FINK.

LAKE STURGEON—*Acipenser fulvescens.* A fish with shields is rather unusual. Yet the sturgeon, source of that costly food called caviar, wears five distinct rows of bony, enamel-covered plates. All the family of *Acipenseridae* are classed, because of these enameled scales, as ganoid fishes, from the Greek *ganos* (brightness, sheen, lustre), and *eidos* (appearance).

Every part of the name makes the picture clearer. The word sturgeon goes back to Old French *esturgeon*; Old High German *sturjo*, and Anglo-Saxon *stiriga*; and probably means "a stirrer", so called, it is thought, because it stirs up mud with its flattened, tapering snout, long in proportion to the length of its body. The sturgeon is a bottom feeder, and the snout is useful for rooting in the mud for worms, small plants and water-creatures, and it contains feelers for picking out food. The word *Acipenser* is derived from the Greek *accipesios*, the sturgeon, and perhaps from Latin *aci-* and Greek *ocus*, swift, with a form of *penna* (Old Latin *pesna*), a wing,

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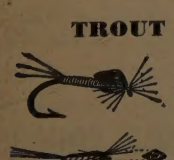

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which is the same as *pinna*, a wing or fin.

That is the third picture—the swiftly moving fins of this "royal fish" which, narrow and elongated, sometimes reaches a length of six feet and a weight of fifty pounds or more; and the fourth is contained in *fulvescens*, tawny, deep-yellow, reddish-yellow, from *fulgere*, to flash like lightning. The species is known also as *Acipenser rubicundus*, meaning reddish, with the English word ruby.

One more fact is told in the name—that the Lake sturgeon is a land-locked species, a fresh-water fish, never reaching the ocean. It lives in the Great Lakes, the Mississippi River, the Lake of the Woods and many Canadian lakes. It is, too, an important fish, for the air bladders are used for making isinglass, and the eggs, or roe, yield caviar.

Sturgeons have a spiracle over each eye, a small opening through which many aquatic mammals breathe. This word comes from *spirare*, to breathe.

The root *ocus* or *aci-*, together with the Greek word for wing, *pteron*, is found in the general name for birds of prey, *accipiter*. The sharp-shinned hawk of North America is *Accipiter fuscus* (*fuscus* meaning dusky or dark), a dusky, swift-winged bird.

It is interesting to note that fossil remains of sturgeons have been found in very old rocks, such as the Eocene, and those fish were twenty to twenty-five feet long.

MARVIN I. MIROFF
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Forestry as a Career

In *The Profession of Forestry*, Arthur D. Read has written a book whose need has been intensified since the establishment of the Civilian Conservation Corps. With the impetus given the forestry movement by the New Deal, more and more young men have been inquiring into the merits of that profession as a career, but with the exception of one or two more or less technical handbooks, and a brief vocational bulletin issued by the United States Government, no detailed, up-to-date guide has heretofore been available for them.

Now, however, in *The Profession of Forestry*, there is presented a clear and honest discussion covering all questions the young aspirant might ask. The book is divided into three main chapters, "The Business of Forestry," "The Employment of Foresters," and "The Demand—Remuneration—Qualifications of Foresters." Under "The Business of Forestry," the author discusses simply and concisely every type of work a young forester might encounter, including mapping and cruising, reforestation, surveying, marking timber, scaling, fire and insect control,

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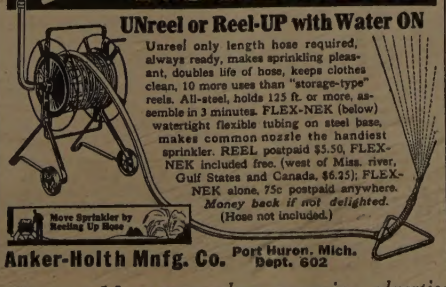

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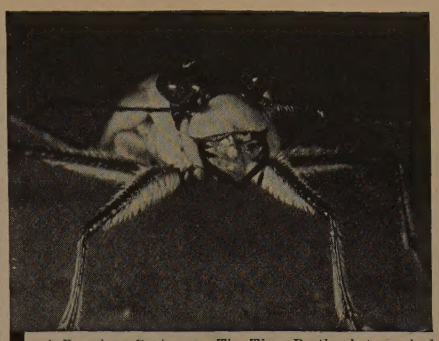

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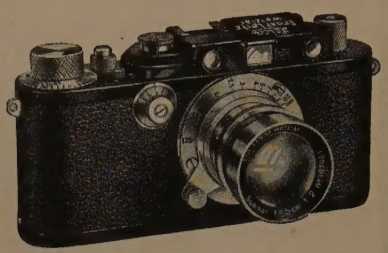

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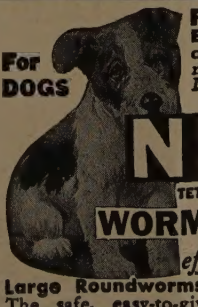

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etc. The second and third chapters enumerate the different sources of forestry employment after graduation, including vocations related to the profession, such as game management, range management, tree surgery, landscaping, etc., and discuss opportunities and remuneration. Last of all, there is given an explanation of the qualifications necessary for a forester and, for the young man whose interest in forestry has been definitely crystallized after reading the book, a few pages of advice concerning study preliminary to the forest school course.

Included in the book is an appendix which gives the addresses of the different branches of the U. S. Forest Service, state forest services, forestry societies and associations, and graduate and undergraduate schools of forestry in the United States.

The author is well qualified to write *The Profession of Forestry*. Holder of a Master's degree from the Yale University Forest School, he has had many years' experience, both with the United States Forest Service and in private industry. Such a background of actual experience, combined with genuine enthusiasm for his subject, makes *The Profession of Forestry* a splendid book for those who want to learn more about forestry. The book is published by the Macmillan Company at $1.25. N. D.

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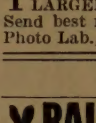

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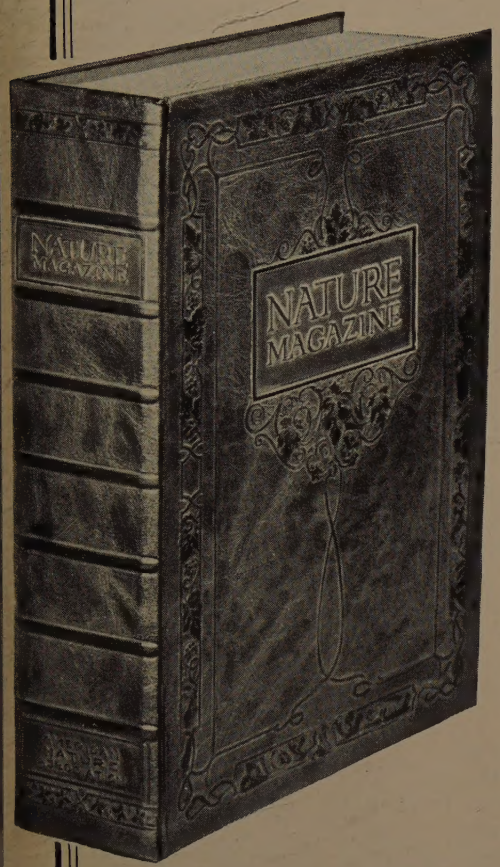

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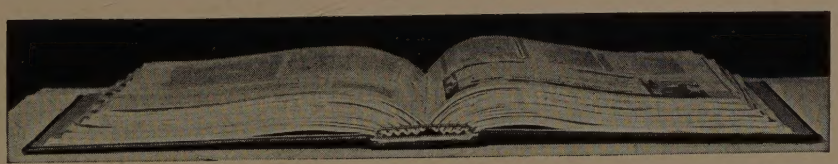

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